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SUB-SAHARAN HUMAN RESOURCES

by

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An Approach to Development Problems in Sub-Saharan Africa

I. The Problem

There is a long-term development crisis in Sub-Saharan Africa. Twenty of the thirty poorest countries of the world are in Africa, and the rest of the continent is not much better off. The oil-importing countries of the region have an average per capita income of only $316. In the decade of the 1970's the World Bank estimates that per capita incomes in the region rose by only 0.2% per annum; and in 15 countries it actually fell. For the next decade, the Bank forecasts a per capita rise of only 0.1% per annum.

Two recent studies originating in the World Bank have described the African development situation and prescribed remedies: An article by Uma Lele which appeared in Science in the February 6, 1981 issue entitled "Rural Africa: Modernization, Equity, and Long-Term Development"; and a staff study led by Elliot Berg entitled "Accelerated Development in Sub-Saharan Africa: Agenda in Action". The latter was done at the request of the African governors of the Bank, an indication that the crisis is not one in the minds of donors alone. The Lagos Plan of Action, approved by the African heads of state at an OAU meeting in April, 1980, also is a testament to the urgency with which African leaders view their development problems.

Compared with other regions, Africa has a number of disadvantages which affect the pace of development. These are well articulated by Lele and Berg and need only be referenced here:

-- Agroclimatic factors, such as poor soils, low rainfall, and diverse ecological conditions. These are a particular problem because most of the world's agricultural knowledge is based upon temperate-zone research.

--Low population density, raising the unit cost of transportation , schooling, health services, agricultural extension, and other development services.

-- Lack of political cohesion, as a result of national boundaries drawn by colonial powers with little regard for tribal or linguistic groupings.

--Social traditions which in some cases inhibit development, such as communal grazing of individually owned livestock, tribal allegiances, etc.

--Relatively low educational levels and literacy rates.

--A high rate of population growth which outstrips the ability of poor countries to provide education and health services.

In addition to these inherent or inherited problems are a number of policy problems identified by Lele and Berg as complicating the development process. These are more controversial than the list above, and many African leaders would disagree with them, but they deserve serious attention by development professionals. They include:

--Peasant agriculture is generally accorded low priority, despite the rhetoric of national development plans.

--Public-sector management or control is preferred for many economic functions which could be more efficiently performed by private enterprise.

--Research and training tend to be neglected in favor of activities promising more immediate results.

--High fertility rates are encouraged regardless of economic and social consequences.

None of these factors is surprising; indeed, the list would be familiar to one who had last worked in Africa twenty years ago. What has changed most perhaps is the optimism with which the problems of raising incomes and spreading benefits are now approached. Twenty years ago there was the heady feeling that the end of the colonial era would release pent up African energies and lead to widespread advancement. Much has been accomplished in these two decades, particularly in expanding education, but there is now a more realistic understanding of rigors of the path to development. The momentum has in most countries played out, and the road ahead looks grim.

For those concerned with development, one of the most disturbing elements of the current assessment is found in Uma Lele's observation that the efforts of international and bilateral donors to Africa are not really affecting long term trends.

II. The Donor Role

International sources of development assistance have not neglected Africa, at least in recent years. Many countries receive between $10 and $20 per year, and some in Southern Africa receive $30-70 per capita per year. This contrasts with Asia, where some of the poorest countries receive $2-4 per capita. The case for special attention to Africa on the part of Western donors is fairly clear:

--Africa is the poorest region, not only in terms of per capita incomes, but in terms of other indicators as well, such as life expectancy, infant mortality, literacy, food consumption and disease rates.

--Medium-term growth prospects for the non-oil producers are poor.

--Africa is not well situated to benefit from the growth of world trade.

--African countries are unattractive to private-sector investors and lenders because of the size of markets, political instability, and limited creditworthiness.

--The continent is important to the industrial world. It is the source of a number of rare natural resources needed for industry and defense, and it has a large number of votes at the United Nations.

The relative abundance of foreign assistance makes Lele's assertion that it has had relatively little impact on long term development the more disturbing. In part, the limited

effect is due to the magnitude of the problems and the relatively low level of local capacity for dealing with them. Other factors which she suggests include:

--A donor preference for project financing, which enhances accountability but limits the breadth of impact of the resources.

--The general lack of coordination among donors, which places a heavy burden upon inexperienced bureaucracies and often yields an unbalanced allocation of available resources.

--The en masse shift of donor attentions to the rural areas in the mid-1970's, which resulted in poor maintenance of earlier institutional investments, and the neglect of higher levels of education and of the policy levels of government.

--The frequent divergence between donor objectives and those of the host government, a fault she ascribes largely to the desire of African leaders for rapid "modernization".

Lele and Berg make a number of explicit and implicit recommendations to donors, and to African policy makers. Both believe that the most promising route for economic advance for most Sub-Saharan countries is to develop a science-based peasant agriculture. This would require overcoming the systematic structural and policy bias against peasant agriculture which they find in most countries. In addition, both recognize that faster economic growth in Africa requires accelerated development of human resources.

Lele feels that more effort is needed to find the appropriate balance between immediate efforts to alleviate poverty and long-term development requirements, an important point to

which we will return. With respect to human resource development, Lele challenges the emphasis given by donors to primary education, vocational training and adult instruction, believing that high-level and secondary education have been slighted.

Berg finds primary level investments in education still have a higher rate of return than investments at higher levels, but does call attention to the need for better policy analysts, economic planners, and public service managers. He and Lele agree on many of the highly skilled tasks that need to be undertaken with donor assistance, such as exploration and exploitation of natural resources, engineering and economic analysis in the energy field, and institutional development.

Higher aid levels are strongly recommended, but even higher priority is assigned to the need for greater attention to peasant agriculture and for more effective employment of existing resources.

III. Implications for AID

AID is in the process of reviewing its policies on many aspects of development interventions. Policy papers exist in draft on such subjects as institutional development, rural development, private enterprise, and policy interventions. These are only in part motivated by the perception of a development crisis in Africa, but the problems of that continent are clearly on the minds of all authors. It is the one region where the success of the development process in which we are engaged is seriously in doubt.

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The contribution of an outsider to the intellectual ferment in the Agency should be designed to add yeast to the process. Although I have examined some of AID's policy documents and program plans, what follows is in no sense a critique of past or future AID efforts. Instead, I have drawn largely upon my own experience in the Ford Foundation and the ISTC Planning Office in the hope of adding a dimension to the thinking of AID policy makers and program staff.

This discussion accepts the Lele/Berg analyses as being essentially correct, although as noted above some elements may be controversial. Several general observations are made below before turning to possible program responses to the key problems which emerge from the analyses.

The general observations concern AID's perception of its role:

1. The first observation concerns the appropriate time horizon for development assistance interventions; that is, at what point are the benefits of an activity expected to be realized. The New Directions mandate of the mid-1970's focused AID's objectives in a healthy way upon meeting the basic human needs of the poor. But it makes a difference if an activity is designed to meet the needs of people this year, next year, in five years time, or in the next generation.

Donor agencies have the ability, and some would say the responsibility, to take a somewhat longer view than host governments which must grapple with pressing day to day matters.

Some donors, such as foundations, can often take a longer view than official donors; they are under less legislative pressure to produce observable results. There is no optimal time horizon for development interventions, it depends upon the nature of the problem and the type of intervention required to meet it. In the case of Africa, it appears from Lele and Berg that the development crisis is chronic, likely to persist for at least a decade and probably longer, and the nature of the problems is such that they will take a very long time to resolve. As Uma Lele suggests, we need to find a better balance between immediate efforts to alleviate poverty and long-term development requirements.

2. A secondobservation concerns US comparative advantage in relation to African development problems. When the US is the major donor, as was the case in Korea and Taiwan in the 1950's and in Egypt today, it is appropriate to shape the assistance program to conform to the range of needs of a country. Given the resource limitations of the US assistance program in Sub-Saharan Africa now, it may be more appropriate to ask what it is the US is best able to supply. The comparative advantage factor becomes more important as the US share of the total assistance burden declines.

There is, for example, a serious shortage of technicians in Africa in nearly every field. Are we the best donor from which to seek assistance in technician training, or are we likely to be a better source of policy level training, management education

resource exploration and exploitation, scientific and social research methodologies or some other rare talents?

3. A related question concerns the breadth of activities AID conducts in a country. The Country Development Strategy Statement (CDSS) required of most missions annually, implies attention to all facets of a country's development. There would appear to be substantial resource savings available, including savings of field staff time, from a greater concentration of AID efforts on activities it is uniquely or best equipped to do, leaving the other problems to other donors.

It is true that <u>someone</u> ought to do a country development strategy statement to ensure that all critical problems are receiving attention. Ideally, the host government would conduct an annual review of its requirements and preferred sources of assistance. From the donor side, perhaps the World Bank could be encouraged to make an annual assessment of development assistance requirements in consultation with the host government and interested donors. That assessment could serve as the basic country analysis for all donors.

4. A final comment concerns equity considerations. Lele and Berg urge increased attention to peasant agriculture because of the potential economic gains to be made in those areas, not primarily because the poorest people live there. In African countries, the issue of equity can present very difficult choices. In the Sudan, for example, the people who live near the Nile are much better off than those in the

western savannah, yet until recently most agricultural research was directed to the problems of nilotic agriculture rather than those of the savannah. This allocation may reflect power relationships, but it also reflects the greater potential for increasing yields in the already more productive region of the country.

General observations such as these can become meaningful only in the context of specific operational possibilities. It is of course, difficult and risky to propose concrete projects or programs from Washington, despite the frequency with which it is attempted; sound country programs can best be designed in the field missions. The examples of program opportunities below are therefore more appropriate to the functioning of the Science and Technology Bureau than to a field mission. The approach used for identifying program opportunities could, however, have field applications.

In approaching a complex set of problems such as those which constrain African development, it is sometimes helpful to consider them in the framework of the principal tools or instruments we use for dealing with problems; namely, policy, organization and technology. Under these headings we can consider the types of corrective action needed, the comparative advantage of the US assistance program in dealing with them, and the potential role of the S&T Bureau. Human resource development is a cross-cutting dimension which will be discussed separately, following consideration of program opportunities under the policy, organization and technology headings.

1. Policy

a. The problem. The economic policies most criticized by Lele and Berg are those which discriminate against peasant agriculture in favor of industry, consumption or commercial agriculture. Examples cited are in the areas of trade and foreign exchange policy, the allocation of resources in the public sector, and agricultural pricing policies. Overvalued currencies, for example, tend to subsidize imports and penalize exports, most of which come from the agricultural sector. A good discussion of key policy variables may be found in a draft paper on policy alternatives being prepared by Michael Crosswell of PPC.

b. Discussion. The Bank's views on policy are not necessarily accepted by African governments. In some cases the Bank tends to ignore political factors which cannot be ignored by those who must live with the consequences of the policies they impose. In other cases, the Bank may misjudge technical factors, such as the inflationary impact of devaluation. In general, however, the Bank is probably on the right track in the long run. A substantial part of African policy deficiencies may be credited to inadequate capacity for analyzing and formulating policy alternatives.

c. Program response. As a major power, the US is not well placed to supply policy advisors; African governments are sensitive to the possibilities of undue influence or domination. Policy advisors, where necessary, should be supplied by the

World Bank, the UNDP or smaller bilateral donors. The private foundations have in the past been an important source of policy advisors, but they have generally retired from the field. The US can improve host country policy making capacities, however, in several ways, such as:

--Training. Special training programs for economic policy makers have run successfully for many years at Harvard and at Williams College. The Kennedy School at Harvard draws on the extensive field experience of the Harvard Institute for International Development (HIID). Williams has several excellent economists with experience in Africa.

--Policy seminars. AID could play a valuable role in helping African policy makers share the experience of other countries and analyze the applicability to their own situations by sponsoring seminars for high-level participants on well defined policy issues. HIID is one of the best resources in the world for mounting seminars on such issues as exchange rate policy, agricultural pricing, and parastatal management policies. The seminars could be held in Africa at institutions such as the Institute for Development Studies at the University of Nairobi or the Nigerian Institute for Social and Economic Research at the University of Ibadan.

--Research. The impact of various policy alternatives which have been tried in Africa needs to be analyzed more carefully than it has been to date. AID could sponsor joint policy oriented research projects with African and US institutions

participating. The Stanford Food Research Center, the University of Michigan, HIID, Williams, Boston, and other US universities have excellent skills in research methodology and experience in Africa. Joint research projects can be a means of strengthening the research capabilities of African institutions. To avoid African fears of domination by academically stronger US collaborating institutions, the projects could be funded through the African participant. The results of the research could of course feed into the policy seminars suggested above.

2. Organization

a. The problem. Africa has lagged in institutional development since independence. Good managers of large organizations are in particular short supply. Paradoxically, African countries tend to entrust a greater share of their economies to the public sector than any other region. Public administration and management training has been high on the agenda of several donors for twenty years, but the results are almost uniformly disappointing. Berg suggests that improvements be sought through organizing smaller parastatal organizations, forming cooperatives, and placing greater reliance on the private sector. The private sector role could be expanded, especially in such fields as marketing of agricultural products, transport, and civil works.

b. Discussion. Although the US has vast experience in training modern managers, these skills do not transfer easily to other cultures. The Europeans and Japanese have

learned much from the US, but they have adapted our methods to their own cultural setting and developed systems that sometimes, like the Japanese, can outperform their mentors. This adaptation has not happened as yet in Africa; modern management remains an alien conception which can be acquired, but only at the cost of still current traditional values. Public and private morality are often in conflict, resulting in the corruption of one system or the other.

Some aspects of management, such as economic analysis and accounting, are more universal than others, such as personnel practices and incentives. Some industries, such as the airlines, have management systems dictated by the technology and international conventions. There is much room for experimentation and research in this field to find patterns of human organization that function best in the African context.

For an excellent analysis of the experience of private foundations in this area, see Francis X. Sutton, "American Foundations and Public Management in Developing Countries" (Appendix A). Sutton notes that "the foundations have been of more consequence in building economic competencies than any of the other efforts they have made to assist the governments of developing countries." (p.10) This may be due to the strength of the analytical tools of the discipline and to the pervasive role of planning ministries in most developing countries.

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A review of the extensive Ford Foundation work in economic planning and administration in East Africa, 1963-76, is found in Appendix B (C.Nelson, "Administrative and Economic Program Review - East Africa", March 1977)

c. Program response. The organization and management problems of African states are so serious that they cannot be ignored, yet the US has itself little applicable experience in the context of African society. Perhaps our most useful assets are methodologies for research and experimentation, and knowledge of successful experiments in Africa and elsewhere. Some program ideas which could be explored are the following:

--Fostering private enterprise. In countries where there is no strong policy bias against private enterprise, AID could build upon ARAMCO's experience in creating small businesses in the Eastern Province (Nedj) of Saudi Arabia. ARAMCO originally set up to meet all its own logistical requirements in Saudi Arabia, but then offered its employees financial backing and guidance to set up small businesses to supply ARAMCO's needs. Some of the employees who took advantage of the offer are extremely successful today. The scheme had several advantages which it would not be easy to replicate. The employees were known to ARAMCO, ARAMCO dominated the economic life of the province, the industry was growing at an extraordinary rate, the Saudis have a powerful tradition of honesty, and ARAMCO provided a ready-made market for goods and services. Some similar conditions could be

found in Africa where mineral exploitation was a primary industry, such as Liberia, Zambia and Zaire. Large corporations engaged in mineral exploitation or processing could be persuaded to examine the ARAMCO experience and determine its applicability to their circumstances. AID could be prepared to share in the costs, for example by offering credit or training to fledgling entrepreneurs. (More detailed information on the ARAMCO experience has been requested from the company.)

--Sharing successful experience in the public sector. African governments have had a variety of experiences since independence in the management of their public services and parastatal organizations. A US institution, such as HIID which has worked with parastatals in Ghana, Kenya and Tanzania, could do case studies of the more successful experiences in collaboration with local scholars. A series of seminars could then be held to permit managers from a number of countries to examine these cases and determine their possible applicability. Examples include the organization of an Economic Service in Kenya which offers a separate career ladder on training opportunities for its members, and generates professional pride and ethics. (Described in Appendix B) The Berg report notes Botswana's planning and budgeting system (p.34) and Senegal's public enterprise contracts system (p.39) as successful examples.

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--Social science research. Professor Gaston Rimlinger of Rice University conducted a study of rural social sciences in Africa in 1981. His report to ISNAR entitled "African Rural Social Science Study" will shortly come to AID through that organization, but Rimlinger has agreed to share an advance copy (Appendix C). He proposes a twenty year program to build up the social science capacities of African governments and research/teaching institutions.

The social sciences, Rimlinger notes, have to do on the one hand with understanding human behavior and the prediction of responses, and on the other hand with understanding the functioning of institutions and organizations. It takes highly trained people and a great deal of information to analyze and predict the level and distribution of costs and benefits of major policy alternatives, and to anticipate the sometimes unintended consequences of social changes which accompany economic development.

Rimlinger visited nine countries in Africa (Cameroon, Ivory Coast, Kenya, Nigeria, Sudan, Tanzania, Tunisia, Upper Volta, and Zimbabwe) to survey the quantity and quality of social scientists and the patterns of their utilization. His recommendations involve strengthening African social science manpower and institutions, networking, and utilization. The dimensions of the program are potentially vast, but it involves activities which can be tailored to the amount of funds available.

The US has a substantial share of the world's social science resources, and should be a major participant in this program. ISNAR would presumably manage the project.

3. Technology

a. The problem. The technology on which to build a science based peasant agriculture in Africa is not yet available. Lele points to the more dynamic development strategy, oriented toward small-farmer productivity, which is now pursued in much of India, but acknowledges that the strategy gained currency only in the mid-1960's when the new high-yielding cereal varieties became available. A comparable technological breakthrough for African food crops has not been made, and does not appear to be on the horizon. Substantial technological progress is likely to require large investments in scientific research at national and regional levels to develop profitable production practices which can raise yields without undue risks for the low-income farmers.

The S&T Bureau of AID has plans for a major project involving farming systems research and extension which will concentrate on adapting existing knowledge and known technologies to the needs of small farmers. This should improve the effectiveness of research and extension efforts in Africa, but it will not address the need for more basic research.

R&D on low-cost farm implements is also needed in Africa. There has been a tendency in Africa to leap from the hoe to the

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tractor when resources were available. The result is a dual agricultural system, with the heavily capitalized modern farms commanding the lion's share of resources and of the attentions of policy-makers, to the neglect of the traditional farmers. Less costly, intermediate technology could be developed which would benefit the poor farmers.

African requirements for science and technology are not limited to agriculture. A high-level US scientific delegation, headed by the President's science advisor, Dr. Frank Press, visited four countries in Africa in September 1980. They received requests for assistance and cooperation which far exceeded their ability to respond. One area of particular interest to African leaders was the application of advanced technologies to survey resources. Activities suggested included a seismic survey of offshore areas of Kenya in search of oil, geothermal mapping of the Rift Valley for energy potential, assessing coal resources in Zimbabwe, evaluating technical reports on an offshore heavy crude field in Senegal, and remote sensing for resources in Nigeria.

Another type of request could be categorized as technological rule-making and organizational innovation. Examples include energy policy formulation in Senegal, environmental laws and regulations in Kenya, regulation of off-shore oil leasing and production in Kenya, environmental impact studies in Nigeria, oil spill contingency planning in Nigeria, quality control procedures for pharmaceuticals in Zimbabwe, and the

organization of research institutions in Zimbabwe.

African governments were also interested in collaborative research on a variety of problems, including infectious diseases, agricultural crops, energy and fisheries; in technical advice and training; and in modern scientific research equipment. (The trip is discussed in more detail in a paper prepared for OSTP in November 1980, "Science, Technology and Developing Countries", by C. Nelson. Appendix D).

b. Discussion. The US has a considerable comparative advantage in science and technology in terms of our own resources and abilities, and in terms of applicability to Africa. S&T involves few of the political sensitivities inherent in policy formation, and requires less cultural and social knowledge of the area than does work on organization and management. Our scientific knowledge and technologies are often not directly transferable to Africa, but more of our R&D capacities could be focused on African problems, and much more could be done to strengthen African R&D capacities.

AID has not made full use of US scientific capacities, in part because of the immediacy implied in the New Directions mandate, and in part due to structural factors in our own government. (This question is the subject of "American Science and the Third World" by C. Nelson, to be published).

C. Program response. Science and technology have a longer time horizon than most program activities, and AID may find it difficult to invest a higher proportion of its

resources in this area. The scope for such investments is, however, vast. Some of the activities which warrant consideration include the following:

--Assessing agricultural research priorities. Lele points out that the challenges to agricultural research systems in Africa are by far the greatest in the world, combining constraints posed by ecological, demographic, technical and institutional factors. (She cites H. Ruthenberg, Farming Systems in the Tropics for more details.) The relative scarcity of African scientists and the level of research institutional development add importance to the process of priority setting. AID could contribute to this process on a regional basis by organizing a study akin to the World Food and Nutrition Study of the National Academy of Sciences, but on a smaller scale. The study could involve African and US scientists who would seek to identify the research priorities for each of the major agro-climatic zones in Africa, and identify key institutions in Africa with the potential for conducting the research. Much has already been done by ITA, ILRAD, ICIPE, and the Club du Sahel on research needs so it would not be necessary to start from scratch.

The study would provide a basis for research investments by AID and other donors. It will be necessary to plan a fairly long process of capacity building - training scientists, improving research station management, and arranging collaborative research projects involving US institutions. The study would

not be worthwhile unless there was the possibility of increased US funding for such activities.

In addition, the study could indicate research problems which could best be undertaken by institutions in the US where a critical mass of trained people and equipment may already be available. Funding for this type of more basic research should at least be shared by the National Science Foundation and the US Department of Agriculture. World food problems have been recognized as a national concern by our government, and should command resources from all appropriate national research institutions, but this has yet to happen.

It may be possible to conduct the proposed study under the auspices of the Consultative Group for International Agricultural Research (CGIAR) or the new development program at the National Academy of Sciences. In any case, the CGIAR institutions in Africa, and ICIPE, should be directly involved.

--Follow up on the Press visit. The Africa Bureau allocated funds from its budget to support some of the activities which were proposed as a result of the Press visit, after OSTP proved unable to gain OMB approval for a special allocation of $10 million which it requested. It may be timely to review what has happened and identify gaps in the US response to the needs expressed by the African governments. Many of the activities proposed could best be undertaken by a Federal agency other than AID, but these agencies were unable to justify them in terms of their congressional mandates.

The requests made by African governments for cooperation in the energy field, particularly for surveying potential resources, warrant special attention. Increased energy costs have added a staggering burden to most African governments. The Department of Energy, even if it survives, is unable to devote attention to the energy requirements of the small nations of Africa. AID could play a special, if unfamiliar, role in helping African nations to accelerate the development of their own energy resources, oil, gas, coal and wood.

--Research on contraceptives. Internationally, funding for research on reproductive biology and contraceptive development reached a peak, in constant dollars, in 1973. Since then the drop has been particularly sharp in funding for contraceptive development. Although it cannot be asserted that improved contraceptives will automatically reduce fertility rates, particularly where infant mortality rates are high, it is clear that better contraceptives can speed the rate of fertility decline when people do decide they want fewer children. The main reason to stress contraceptive research here is that it represents the dimension of the population problem where the US has a clear comparative advantage, and a concomitant responsibility.

Appendix E is an article which appeared in Family Planning Perspectives in 1980 which describes the state of the art of contraceptive research. ("Prospects for Improved Contraception", by Linda Atkinson, S. Bruce Shearer, Oscar Harkavy and Richard

Lincoln). Of the more than two dozen potential new contraceptive methods currently receiving attention by research and development organizations, the authors chose five to illustrate the problems and potential of such research: nonsurgical female sterilization, a reversible sterilization for men, an anti-pregnancy vaccine, a self-administered menses inducer, and a postpartum IUD. They conclude that under favorable conditions, some of these methods could be available for public use within a decade; but funding limitations make it unlikely that any will be in use before the end of the century.

--Medical research. Although the US is the world leader in medical research, our efforts directed against the scourges of Africa are meagre. Tremendous strides in the health field are possible, according to Dr. D.A. Henderson, Dean of the School of Hygiene and Public Health at Johns Hopkins University and leader of the successful campaign against smallpox. Technological adaptation and the development of more effective delivery systems are possible and promising, but the health field is starved for funds relative to the amounts going into other development fields, particularly agriculture. To quote from a recent personal communication from Dr. Henderson: "The amounts of money being made available for research in tropical diseases represents a pittance. Much has been made of the problem of schistosomiasis but malaria is far and away a more important problem and now with drug-resistant malaria, insecticide-resistant mosquitos and an absolute dearth of vector

biologists to deal with the problem, malaria morbidity and mortality is assuming alarming proportions. At the same time, we are now documenting drug resistance to dapsone, the only really effective drug for the treatment of leprosy. Recent studies suggest that the BCG vaccine against tuberculosis, now used in many areas, is of perhaps no efficacy whatsoever. All of this is, of course, compounded by the fact that health organization and management in the developing countries probably is as bad or worse than that in any other government sector. In brief, (by comparison) such initiatives as we are now taking in agriculture are on a scale and of a degree of sophistication which to the health professional is all but mind-boggling."

On US institutional capacity for dealing with developing countries, Dr. Henderson adds: "The university reservoir of scientific and educational expertise is very rapidly drying up. Several schools, as a matter of policy, have decided that they could not afford to devote so much time and energy to the laborious and complex process of assuring sufficient funds for an international health effort and have abandoned these programs. Although Hopkins has perhaps the largest critical mass of faculty and students in international health, there is increasing feeling that we would be better served to focus on domestic issues and undertake the international as an adjunct rather than as a central, primary thrust."

It may be argued that it is not AID's responsibility to undertake the basic research needed on tropical diseases, or

to maintain the international capabilities of our best public health faculties, but surely it is a national responsibility to pursue these matters. If AID cannot afford the investments, perhaps the Secretary of State could request that the National Institutes of Health give tropical diseases higher priority in the interest of US foreign policy.

In this field, as in energy and agriculture, the US has the world's foremost assets for problem-solving research, yet they are underutilized with respect to Africa because of structural defects in our system of budgeting and administration. This is a problem which the S&T Bureau should seek the Secretary's assistance in placing before the National Security Council.

4. Human resources development.

The development of human resources is of course the primary dimension of the interventions suggested in the above paragraphs. They are largely concerned with the shaping of better policy analysts, managers, scientists and technicians and with designing improved environments for the effective utilization of these skills. In this section, we approach human resources not from the viewpoint of the skill requirements of development tasks, but from the broader perspective of the changes in attitude, values and beliefs which are inherent to the modernization process.

Human resources development is what the development process is all about. We have long understood why it was possible for

the Marshall Plan to be such an immediate success in the rebuilding of Europe. The human capital was already in place. We also understand in a general way that the creation of the specific skills required to manipulate advanced technology is not sufficient; that is, more profound changes occur in a society during the development process than the mere acquisition of skills Just what those changes are, and how they are brought about, and what form they will take in different cultures are much more difficult questions for which we have no clear answers.

We do know, however, that formal education has had a major role in the modernization of all the countries today considered to be developed, and that it is difficult to conceive of populations being able to participate in the struggle for development if they are not minimally equipped with primary level skills of literacy and numeracy. The sheer magnitudes of investments by poor countries in their education systems testifies to the universalityof the belief that education is the path to modernization. In Africa, a significant number of countries devote between 25 and 35 percent of their recurrent spending to education. On average, education claims about 16% of public expenditure, more than any other government function except general administration.

It is, I believe, generally accepted in AID that the efficiency and effectiveness of the education sector are a major concern of the Agency because of the size of the sector and the inherent value of its purposes. Much has been written

about interventions in education planning, administration and research, and AID has experience in all these fields. Thus recognizing the primacy of these areas, and AID's expertise in them, we may pass on to issues which may be more speculative and perhaps controversial.

a. Science and mathematics education. This area is neither speculative nor should it be controversial. The US has initiated an unprecedented number of new approaches to the teaching of pre-college science and mathematics in the past two decades, and in earlier years AID took the lead in sharing the benefits of this work with developing countries. AID is still engaged in important innovative projects in this area, such as the radio math project in Nicaragua, but in recent years the overall effort has dwindled. Some of the curriculum centers established with US assistance have become isolated from science educators in the United States and from educational innovations in the rest of the world. There is a need and an opportunity to re-establish communication with these centers and to set up mechanisms for future collaborative efforts to improve science and mathematics education.

Few areas of activity would appear to hold greater attractions for US assistance programs than science and mathematics education. It is profoundly modernizing in its educative impact, it provides essential preparation for later skills training, it is relatively transferable and the US is well equipped institutionally to work in the field. The attached

paper, "The Improvement of Science and Mathematics Education in Less Developed Countries" (Appendix F), was prepared by Douglas M. Lapp for the ISTC Planning Office. It contains a review of developments in science and math education in the US, an an assessment of previous efforts to improve science and math education in developing countries, and recommendations for a program.

Also attached (Appendix G) is an evaluation of the Ford Foundation's work in helping to build the Science and Mathematics Education Center at the American University of Beirut, in which a conference setting is proposed for the discussion of the interests of regional curricular development centers in linkages with one or more US institutions.

b. Child rearing. Here we are on less firm ground. We know from research in the United States that the best predictor of success in school is the quality of the child at the entry level. It seems that a very high percentage of both affective and cognitive attributes are formed by age six when a child normally enters the education system. (See Benjamin Bloom, Stability and Change in Human Characteristics.)

In developing countries, we know relatively little about the quality of the home environment in which children spend these critically formative first years. Some studies, such as a Child-rearing Beliefs and Practices study conducted by the Ford Foundation and UNICEF in Oman, reveal a pervasive atmosphere of superstition in the home. The most limiting

attitudes and beliefs concern the supernatural origin of disease and the notion that until school age a child is unteachable. These attitudes cannot help but affect the performance of a child when he or she reaches school age.

Interventions from abroad in this area are inherently difficult, dealing as they do with the intimacy of the home environment. Governments are often sensitive about the presumption of less than wholesome traditional attitudes in their societies; the Omani Government, for example, was much impressed with the results of the study but refused permission for its publication. Nevertheless, small scale interventions can be made and may have important long range results.

An example is a booklet written in simplified Arabic by a Sunni Lebanese woman with a masters degree in child development psychology entitled "Your Child, Zero to Five". Saniyeh Othman, the author, interviewed health and psychology professionals in several Middle Eastern countries to identify the most important and pervasive child-rearing malpractices. Her book reinforces positive aspects of traditional child-rearing, such as breast feeding and the warm atmosphere of the home, and gently chastises certain common errors such as using fear as a behavior control mechanism. Throughout she stresses the importance of the early years to later personal development. The book is now in its fifth printing, a best seller.

AID's role in this field should be small, but could be important. Support for research and training of local professional, and for the preparation of child-rearing materials for local voluntary agencies would be useful.

c. Leadership development. The first generation of African leaders is now approaching retirement in those countries where circumstances have permitted full careers. One suspects that many countries will in time, like the United States, look back in awe and wonder at the quality of the founders of their nations. In these days of egalitarian belief, it is sometimes forgotten that there were some remarkable educational institutions in the colonial era, few in number and elite in character, but extraordinary in quality. Two that come to mind are Alliance High School in Kenya and Bakht-er-Ruda in the Sudan.

Both of these institutions, but particularly the latter, had as part of their objectives character building. Bakht-er-Ruda was purposely located a hundred miles south of Khartoum, at a rather inaccessible point on the Nile, far from the bright lights. V.L. Griffiths, its founder and author of An Experiment in Education based on the experience, introduced a modified Outward Bound element in the curriculum. The school was designed to train rural intermediate school teachers, and to give them the self-reliance necessary to function effectively in remote areas. Today, its graduates are found throughout Sudanese society, often at the ministerial level or as senior diplomats.

They are a distinctive group of people. Something happened at Bakht-er-Ruda that sets them apart from others, as they themselves are aware. Several of them once attempted to induce the Ford Foundation to re-create the institution, with modern Sudanese values, but with emphasis on character building. One of my personal regrets is that we in the Foundation found no feasible way to act upon that request.

Unfortunately, no ready-made projects come now to mind. It may not be feasible even if resources were available, to launch an elite educational stream, and many would find it objectionable to try. Yet the problem of leadership development remains and one fears that advanced training in the techniques of economic policy analysis, while necessary and desirable, may not be sufficient.

IV. Conclusion

This paper indulges the freedom of the outsider to make arguments and proposals without the nagging constraints of budget and manpower with which AID's planners and programmers must daily contend. But it is the function of yeast to make the bread expand to fill the pan it is in, and to bulge suggestively over the top. Even in times of severe budgetary stringency, AID must be considering the broader range of action which needs to be undertaken when funds are more abundant, or when the US accepts a different view of its international interests and responsibilities.

A Ford Foundation Reprint

American Foundations and Public Management in Developing Countries

by Francis X. Sutton

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INTRODUCTION

It is not easy to peel away the luxuriant emotional attachments we have to the words "philanthropy" and "development." The attachments are of different sorts, some positive, some skeptical, a few negative. Not many years ago, when development assistance was viewed with optimism and enthusiasm, and we were all *biens pensants*, one could assume much and hurry on to the practical and technical business of linking the philanthropic foundations with the programs and needs of the developing countries. Nowadays, matters are more complicated. It used to be assumed that everyone knew what was being talked about when the word "development" was used; now one may have to bare a paradigm to be understood. Similarly, philanthropic foundations have come to be entangled in debates over transnational processes, establishments, intellectual dependency, and worse.

I hope in the main to deal here with the past and current engagements of foundations with the governments of developing countries. But I must begin with some broad discussion of context. We now have enough perspective to see the ideology of development as a historical entity of great international consequence in the years since World War II. The participle "developing" became attached to a large number of new states that blossomed into national sovereignty in the last decades, and a number of long-existing states found it convenient or appropriate to accept the label for themselves. The status of being a developing or a developed nation became a basis of admissible, proper, or morally demanding international relationships. International agreements under the United Nations and otherwise, and domestic legislation, came to be phrased in corresponding terms, and important programs of development aid and technical assistance were established and maintained.

A concept like development that assumes broad and fundamental importance in international affairs has, of course, no precise meaning. It could indeed not serve as a common basis of agreements and action if it were to be subject to precise specification. But this does not preclude the elaboration

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of doctrines and theories of development from various points of view, some interested, and some disinterested, some clearly political and others as scientifically detached as professional social scientists manage to be. Amid much variation, theories and ideologies of development seem to have had these common elements: (1) they are egalitarian, both in the sense of stressing self-determination for peoples hitherto, in whatever humble statuses, and in stressing the right of all to the advantages of development; (2) they are materialistic in the sense that they stress improvement in economic conditions; and (3) they are activistic in the sense that they stress the possibilities of improvement through deliberate, rational effort. The emphasis on self-determination has given the governments of so-called developing countries a kind of ultimate authority on what development should mean within their countries, and the role of external agencies has been defined so as to stress avoiding any cultural or political ascendancy. Technical and economic assistance has had legitimacy when it did not taint the independence of the receiving countries. There have always been disputes and uncertainties over the boundaries of proper development assistance, and, of course, there have always been fundamental critics of the whole set of conceptions as a cover for capitalistic imperialism or the maintenance of dependency. But it is historic fact that enough general acceptance has been achieved by the guiding ideas that major programs of aid and technical assistance have been carried out through several decades.

It is in this general context that the foundations have found a place for a great part of their international efforts in the last decades. We commonly speak of "philanthropic" foundations, and the largest American foundations have frequently been characterized as "research" foundations. These two labels may be used to characterize foundation activities in the developing countries. The philanthropic tradition in the United States (and elsewhere) is a tradition of voluntary private effort in behalf of the well-being of others. It has, of course, piayed a very substantial part in the provision of many social services that we now regard as the proper function of government, but were for a long time not so regarded. It has had substantial links with religious traditions and the organized churches, and like them has commonly had an international reach. However one regards the merits of the missionary tradition, it is a logical accompaniment of Christian universalism and carried along with it the traditions of Christian charity. This has meant that the philanthropic tradition in the United States has long been international. Indeed, as recently as the Pearson Commission report, it has appeared that private flows of international assistance still have their largest sources in the religious philanthropic tradition.

Foundations derive from the philanthropic tradition, and in their larger modern forms have added emphases suggested by the label "research foundation." Research is an accurate characterization for only a part of what large foundations do, but it points clearly toward their strategy and associations. The prominence of research and training, pilot studies, professionally planned experiments, and the like in the work of foundations, domestically and internationally, has typically been a consequence of their efforts to probe for the roots of social problems and develop better means of dealing with them. This is what is sometimes labeled "modern philanthropy." As any professional in it knows, to his frequent discomfort, it differs from simple, open-hearted generosity. By practicing it, foundations regularly have been engaged in building and mobilizing scientific and intellectual resources, and when they reach out internationally, they inevitably do so in close association with these resources.

The history of modern American foundation activity in the poorer areas of the globe goes back to periods before we called these areas "developing." The Rockefeller Foundation was, of course, the great pioneer, principally through its work in public health, and this work displayed basic features that are still characteristic of foundations. As Fosdick has described in his history of The Rockefeller Foundation, the concern of the famous Rockefeller public health programs on hookworm

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and yellow fever was not simply to understand what ought to be done about them but to bring them under effective control. They were, of course, programs based on research, but they were also philanthropic programs in the sense that they sought concrete results in the improved health of large numbers of people. The effective development of public health programs naturally involved relationships with agencies of government, in this country and internationally, and there was consequently a tradition of work with governments overseas when foundations came after World War II to want to play a role in the development process.

Being philanthropic, research-minded, and, although private and independent, accustomed to dealing with governments, the foundations found the frame of development assistance a comfortable one. Trying to help foreign governments with their programs might in other circumstances be viewed with disfavor, or be closely circumscribed. But as long as the governments were defined as "developing," and thus as deserving of technical assistance, there was large scope for such activity, with results I shall describe.

We are now at a time when the doctrines of development that I have sketched as a working framework for international relations are under rapid change. The easy acceptance of relations between the developing and the developed is now perturbed by the substance and rhetoric of North-South conflict. The erstwhile "developing" nations have come to various forms of maturity. They propose a new international economic order, but a generally accepted orthodoxy such as the idea of development once provided has yet to emerge. The relations that foundations have had with governments during the past quarter of a century or so have been evolving correspondingly. In what follows, I shall distinguish an initial period, running roughly from about 1950 through the middle sixties. This was the era in which there were many new nations, the ideology of development and development assistance was quite generally accepted, and foundations worked readily within the context. The eight or ten years leading to the present have give much experience of evolution into new patterns, and I shall try to characterize what they now mean for the relations of foundations and governments.

FOUNDATIONS AND GOVERNMENTS IN THE ERA OF TECHNICAL ASSISTANCE

Scale and Types of Foundation Engagements

There has not been to my knowledge a serious scholarly analysis of the range of engagements of the foundations with the developing countries in the years since 1945. Not surprising, since the subject is a rather sprawling one. Quite aside from the problems of which the Church Committee report has recently reminded us, there are masses of scattered information that would require scholarly effort far beyond what can be attempted here. At best, I can provide only a sketch of the main pattern as I have perceived them, and focus on the activities with which I am most familiar.

There is only a small fraction of this country's thousands of philanthropic foundations that has engaged in international activities. Even if one takes a liberal meaning of the words "international activities," and includes support of studies and research on international matters within the United States, the fraction still remains small. For the years prior to 1967, the Senate Select Committee to Study Governmental Operations with Respect to Intelligence Activities (the Church Committee) has now emphasized that a part of the ostensible foundation funding for international activities was in fact provided by the CIA.[1] But the relative magnitude of this CIA funding should not be exaggerated. The committee noted explicitly the exclusion of the so-called "Big Three" foundations—Ford, Rockefeller, Carnegie—from this kind of funding (and indeed of any operational use of the individual grantees or employees of these foundations by the CIA).[2] Since the Big Three have regularly provided well over half the funding of international activities by American foundations, both before and after 1967, the greater part of

1. *Final Report, Book I, pp. 181-82 (Report 94-755, Senate, 94th Cong., 2d sess.).*
2. Ibid., *p. 190.*

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such funding remains untainted by the committee's revelations.[3] The limitations of my knowledge would in any case force me to restrict this discussion to the work of the Big Three Foundations and, indeed, largely to the Ford Foundation, but it is reassuring to be able to do so with confidence that we are dealing with the largest volume of international foundation activity, and can neglect questions of covert governmental connections.

The separation of the funds for international activities that are spent in or directly related to the developing countries is an exercise that we find difficult and complicated for the Ford Foundation alone, and that no one, to my knowledge, has attempted for all foundations. One can judge with some confidence, however, that there was, in the years after World War II, a great increase in the attention given to the developing countries. The entry of the Ford Foundation into major programs after 1950 made a large difference in itself. From 1950 through 1975, the Ford Foundation committed about $1.5 billion to international activities, of which a little over $1 billion has been devoted to problems of development. A considerable fraction of the remaining $0.5 has been devoted to studies of the developing countries in universities in this country and abroad, and to other activities that in one way or another relate to the developing countries. The Rockefeller Foundation, as I have already noted, had a long tradition of engagement in the developing countries through its concern with public health and, increasingly, agriculture. During the years after 1950, it added a broad concern with university development in the Third World, and for considerable periods has devoted more than half its annual commitments to overseas development. The Carnegie Corporation, in its Commonwealth Program, has during this period concentrated notably on the "new Commonwealth," particularly in the Caribbean and in Africa, and in the field of education. Carnegie and Rockefeller have thus been strongly engaged in what we commonly call "sectoral" development activities, and indeed a large and growing fraction of the Ford Foundation's development expenditures are of the same character. Such sectoral development activities, whether in the fields of agriculture, population, education, health, or otherwise, typically involve close relationships with the political leadership, the bureaucracies, and the professional specialists of the developing countries. These "sectoral" engagements fit very well with the prevailing conceptions of unintrusive technical assistance that has been the ruling doctrine for acceptable relations with the developing countries. They did, of course, require broad views of the needs and problems of the developing countries beyond the specific professional problems of the sector in question. Thus, for example, a concern with building universities in Africa had to be related to the manpower needs of fledgling African states. Ventures like the Ashby Commission in Nigeria, or the planning conferences for the University of East Africa, in which the foundations were substantially involved, had to be based upon good understanding of the capacities, the financial resources, and the future needs of African governments. Similarly, commitments to community development or agriculture in India had to be related to major questions of political integration and developmental policy in the subcontinent.

It is, I believe, not simply a fault of my personal perspective to think that the engagement of the Ford Foundation with the governments of developing countries has been at once more intimate and more comprehensive than has been characteristic of other major foundations. From the beginning of its work in the Indian subcontinent, through a

3. Not enough figures were given in the Committee report to permit precise calculations, but one can make estimates using data published in the Foundation Directory. In 1957, the first year the Directory reported amounts devoted to international activities by American foundations, the total was $33 million. In that year, the Ford Foundation's commitments (according to our own records, and not precisely compared with the Directory's listings) were nearly $25 million. In 1962, after the CIA's "massive" use of foundations began, the Directory reported $106 million, a year in which the Ford Foundation committed $57.5 million for international activities. In the peak year 1966, the Directory's sum is $170 million, and the Ford Foundation's $124 million. The Church Committee asserts that in 1963-66, nearly half the grants made by the foundations other than the Big Three in the field of international activities involved CIA funding (p. 182).

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long series of engagements elsewhere in Asia, in the Middle East, in Africa, and (in a somewhat different way) in Latin America, the Foundation has worked directly and very broadly on matters of government structure, staffing and general competence. We shared in the common conceptions of the time that made well-functioning governments indispensable agents of development. Indeed, as African experience particularly vividly displayed, the possibility of a well-functioning government entered centrally in the negotiations over independence and was a major preoccupation of development policy. Governments of new nations had our unambivalent sympathies. Relations that now look surprisingly trusting and intimate were both welcome and acceptable on both sides. In Latin America, relations were rather less intimate, but the "modernization" of governments there too was conceived as an essential part of development.

Two broad strands of Ford Foundation activity and a third of less persisting character emerged from this concern to build new or modernized governments. These were: (1) the installation and improvement of public management to serve development; (2) the building of economic planning competencies; and (3) the outreach of government and engagement of the general populace through such measures as the community development movement. The first two of these activities have engaged the Foundation throughout the period since 1950. We have a category in the standard classification of our commitments entitled "development planning and management," which is credited with some $213 million through 1975, somewhat more than we have committed to population ($204 million) and agriculture ($177 million) over the same period, but rather less than education ($288 million). The engagement we had with community development in India in the 1950s gets classified as "rural development" on our books, but it is evident, of course, both from what Nehru said about the program and much subsequent analysis that it was concerned with the lasting problems of engaging and benefiting total populations in development. Both governments and agencies like the Ford Foundation continue to grope for means of effectively serving this egalitarian ideal and integrative necessity of development. But these are, of course, massive and deeply political matters where a legitimate role of outsiders is hard to find, and no persisting strand of activity like these on economic planning and public management is to be found in our work. It is, I believe, fair to say that insofar as we have been able to make contributions in these matters, they have been incidental to general development planning and to the sectoral development concerns that were noted earlier and that I shall return to below.

General Efforts to Improve Public Management and Planning

Three broad purposes may be distinguished in the efforts that have been made to shape and improve public management in the developing countries. First, there was the aim of indigenizing governments in the many cases in which countries came to independence with the machinery of government largely staffed by former colonial officers, or "expatriates" as they and other foreigners came to be called. Second, there has been the aim of transforming the character and aims of government to serve development. And, third, there is a residual category that embraces a persisting variety of efforts to improve the functioning of government. The modes of engagement for foundations in all cases have involved technical assistance, education and training, and research. In many cases, perhaps typically, there has not been a clear division between the three broad purposes, but emphases have differed markedly in different times and places and the analytical distinctions serve usefully as a frame of exposition.

Indigenization was of necessity the central initial issue in the ex-colonial countries of Africa and in some places elsewhere. The problem was to replace the former colonial administrators as rapidly as was consistent with the maintenance of competent performance. Evident needs were a supply of nationals with the necessary education and provision of suitable training and apprenticeship. But the problem went much beyond simple replacement. If the normal pace of training on the job and promotion that had characterized the colonial

services were to be maintained, it would take a full generation of independence to achieve an indigenized government. Incredible as it may seem, there were those among the colonials who confidently looked forward to being needed and acceptable for such long periods. But political realities were quite otherwise, and new independent governments were under great pressure to bring about indigenization at paces that seemed reckless to the old colonial hands. They had both to achieve rapid movement and show their citizenries that they were doing so. If there was not to be heedless turnover, there was a need for planning, reorganization, and accelerated training, and all formulated in explicable policy.

A resort to the skills, knowledge, and resources of outsiders to deal with these problems came readily. The necessary psychological and ideological bases were present both for the newly independent countries and for agencies from the developed countries. The former colonial powers took an important place, indeed typically the dominant place, in relation to their former colonies, but there was an urgent desire for wider contacts and for fresh ideas. It became conventional to talk about countries adopting the best ideas they could find in the developed world and making their own distinctive synthesis of them. American ideas and resources had, of course, great prestige, perhaps particularly in management and administration, and there was no want of self-confidence in the purveyors of things American. Sharp competitions often developed between those who were determined to replace a mere colonial heritage with fresh and more appropriate ideas and practices. The effects of this competition were often not happy ones, and there was a natural desire for "aid without strings" in more than a financial sense.

The American foundations, and the Ford Foundation in particular, naturally had their most familiar and easy access to American skills and conceptions. But they were not officially committed to the advancement of American national interests, and their actions have typically been taken on independent professional judgments. It is a subtle and difficult matter to try to say how they were perceived by new governments. Sometimes, as in the ex-French African states, the impression of their English-speaking, American character seems to have been dominant. But in the English-speaking countries, the reception was easier, and intimate engagement in the problems of indigenization developed quickly in several places. This included not only the introduction of training and the building of appropriate institutions. It also included technical assistance in planning of the indigenization process, in reorganizations to permit more rapid change by adaptation of structures for less experienced and professionally qualified staff, and in devising training programs. Africa was the main scene of these efforts, and Nigeria, Tanzania, Kenya, and Zambia became the foci of long-continued and important efforts.

If one tries to categorize the main features of the foundation inputs in the planning and execution of these indigenization programs, the following stand out: first, there was a readiness to be pragmatic and eclectic, particularly with respect to British colonial administration. In contrast to some other agencies, the foundations found it possible to work closely with former colonial officers. Many of these had been vigorously committed to colonial devolution and they were known as such and trusted by the leaders of the new governments. We in the Ford Foundation hired a few of them after their retirement, and some of the most distinguished performances we have observed were the result. A second contribution lay in American experience in manpower planning and job analysis. We leaned heavily on a group of people who had had experience in these subjects in the Department of Labor, and in the vast efforts of organization and training that World War II had required. Manpower planning was then not viewed with the critical doubts that have latterly been cast upon it, and it became, in various modes, an essential element not only in the planning of governmental staffing but also more broadly of secondary and higher education. A third element was the American confidence in possibilities of training, including a belief that there were a variety of techniques not yet used in new nations that needed to be tried.

The European colonial traditions had been much less sanguine about the possibilities of formal training, at home or abroad. American impatience with intangible qualities such as experience, or habit of command, conformed with the hopeful optimism of new states that their peoples were capable of running modern governments in short order, given the necessary training; to have believed otherwise would have been disloyalty to the egalitarian and activistic ideals on which national independence was based.

Building on these elements, advisers supplied by the Foundation to governments were able to help in devising programs for training, reorganization, and replacement. This sort of advisory activity became sufficiently in demand in the early sixties that the recruiting capacities of the Foundation were very hard-pressed. Indeed, this field is one that is good support for Ian Little's argument that, for Africa at least, there simply were not enough well-qualified people to meet the demands for technical assistance.[1] The positions of highest responsibility, typically called staff development advisers, had the most difficult requirements. But the needs for training specialists, manpower planners, and job analysts were also hard to meet with the talent one could find. The difficulty lay in the fact that no routine transfer of techniques looked satisfactory; a creative response to the special circumstances of each country had to be made. Intellectual and operational challenges were typically present, but there was also a great deal of detailed work that offered limited promise to the academic or theoretically minded. The history deserves more careful and objective review than I am able to give it here, but I offer the summary observations that: (1) there was rather limited recourse to American universities, in public administration or in related fields; (2) we had a better batting average with British ex-colonials than with Americans; and (3) we recruited more mediocrities and failures in this field than in any other, except perhaps education.

Faith in training was never so naive as to ignore the educational and talent base on which specialized talent could be built. Hence a central question in planning had to be the distribution of effort between the higher and secondary educational system on the one hand, and direct job-related training on the other. Very sharp debate went on over the appropriate focus for foundation efforts. A natural and familiar association of foundations with universities made a focus on preparatory higher education appealing, and indeed a great part of what was done by foundations in the developing countries has been directed toward building their universities and some other forms of higher education. But the immediacy of indigenization problems called for attention to job-related training of much narrower sorts. Enthusiasm for setting up new training institutions ran very high, and a prudent reserve became perhaps as important as forthcoming generosity. There were particularly vigorous arguments within the Ford Foundation over the appropriateness of expenditure of training institutions for middle and lower levels of governmental functions. "Leave all that to USAID," some said. Others defended a direct concern with manifest present need over high policy and more academic priorities. The numbers of people to be trained for governments of larger countries made such undertakings appear awkwardly large for foundations. But there were needs to get new institutions started and to train the staffs that (in principle!) would continue to run them that sometimes looked to be feasible undertakings. The Ford Foundation engaged in several such ventures, the largest being the Ecole Nationale de Droit et d'Administration in Congo-Zaïre, to which more than $3.5 million was given over ten years.

Indigenization was a concern of only some of the developing countries. A transformation to development commitment and the modernization of government has been the concern of all. This thrust for change was of course wrapped in high and diffuse aspirations. Government was to be the

1. *Robert Chambers,* Managing Rural Development/Ideas and Experimentation in East Africa *(Uppsala: The Scandinavian Institute of African Studies, 1974) p. 214, James R. Finurane,* Rural Development and Bureaucracy in Tanzania: The Case of Mwanza Region *(Uppsala: The Scandinavian Institute of African Studies, Richard Fraenkel,* Policy and Change in a Farming Locality of Northern Tunisia, *1974), p. 192 (paper presented at Middle East Studies Assoc. Meeting, Boston, 1974).*

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appropriate and effective instrument serving the new purposes of a changing social order. In Latin America, there was a remarkable demand for old governments to cease defending the existing social order and bring about a social revolution to a new one. In keeping with the egalitarian, materialistic, and activistic principles of development, emphasis on economic growth and the spreading of its benefits to total populations became characteristic. Indeed, the focusing of development efforts on economic growth has been so central that we frequently forget the extent to which the building of new states and their governments was an intrinsic and essential focus of "development." Economic development was readily accepted as a prime responsibility of government, and the desirability of central economic planning by governments of developing countries came, rather surprisingly, to be uncontroversial orthodoxy, even among Americans and Europeans who were more reserved about its applicability at home.

It can perhaps be argued that the foundations have been of more consequence in building economic competencies than in any of the other efforts they have made to assist the governments of developing countries. To argue so is not to ignore the controversies over the effectiveness of economic planning. Rather the argument is based on the marked increase in the importance of economic qualifications for government service and the powerful influence economists have come to have in the policymaking of many governments. The famous Berkeley "Mafia" that has played such a central role in the government of Indonesia since 1965 is only one of the most spectacular cases of the power of trained economists. The remarkable expansion of the place of economists in the governments of advanced countries in the past decades has been broadly paralleled over much of the developing world. In Latin America, the economists' competition with older legally trained governmental elites has been conspicuous and, over much of the rest of the Third World, the growth of authoritarian governments has given economists in the civil service great scope for influen e.

The foundations—notably Rockefeller and Ford—have shared the contemporary faith in economists and a persisting goal of their efforts has been to build national competence in the field. How to do so in a serious way is less than obvious. There are questions about the numbers of people needed at various levels, the location of effective training, the mix of research and training opportunities. Indeed, a kind of subspecialty of the philanthropic craft has grown up around the questions, and the larger foundations have people who take responsibility for knowing when somebody should be trained at home, sent, say, to the Philippines or to the U.S., and if the latter, whether to Harvard or Williams or Vanderbilt or someplace else. Special programs have been devised for civil servants, first in this country (as *e.g.*, at Williams), more latterly abroad, as in the programs at Nairobi and Ife (Nigeria). The intelligent development of such programs obviously requires an informed view of the needs of developing countries' governments, which in many places has flowed naturally from other engagements in technical assistance.

The provision of economic planning advisers to developing countries has been for many years one of the most important activities of the Ford Foundation. More than $40 million have been committed in Iran, Pakistan, Malaysia, Indonesia, Kenya, Nigeria, Colombia, Chile, and elsewhere. A large part of this work has been done by the Harvard Development Advisory Service (now transformed into the Harvard International Institute for Development), but there have been places in which the Foundation directly employed specialists and assigned them to the governments in question. The guiding principles of this work were essentially those of technical assistance generally—competent professionals were to work with counterparts, training as they worked, and supplementary opportunities of training and research were provided with the general aims of building the planning functions into government as expeditiously as might be. Careful efforts were made to recruit international teams and to enable advisers to work loyally for the countries of their assignment. Intimate and trusting relations have been typically established.

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While there has been a natural decline in this sort of engagement as governments have become more confident and independent in their operations, the decline has been rather slower than most of us expected, and frequently the Foundation has had to hold firmly to schedules of termination in the face of much national reluctance.

From the point of view of impact on government structure and functioning that interests us particularly here, one may note, first, that the central role given to national planning in many countries made the planning agency a focal point for consideration of a great range of national policy, not only economic policy. To engage in economic planning without considering the administrative strengths of government, its capacities to stimulate private business or relate to the peasantry, is obviously unrealistic. Planning organizations thus have tended to reach into the broadest questions of governmental capacity. In cases like India or Pakistan, they became kinds of superministries, and even when they were less powerful, they became the stimulants to studies and movements for reorganization and reform. The demands of planning also emphasized the need for professional specialization not only in economics and gave impetus to professional qualifications much more widely in governments. Planning thus became an important stimulus to the broader "modernization" of government that was always sought in principle but often constrained by inertia and vested interests.

High new purposes of government obviously implied demands for high capacities and performances. The maintenance of firm national control was axiomatic necessity, but new governments insisted that this should not be at the expense of efficiency, and older governments called for transformations to meet new goals and responsibilities. The broad aim of having a modern, efficient government that would be the leading agency of development became standard. For example, in India, the Ford Foundation perceived the aspirations of the Indian government as follows:

> *With the winning of independence, the Indian government recognized the necessity of making fundamental reforms in its administrative structure and character. From a government which had been designed chiefly to maintain law and order, to collect taxes, and to administer a dependency, it had to develop into not only an independent and democratic government, but a service government, capable of planning and putting into action an intensive welfare program and of providing forceful leadership and action in meeting the needs of its people.*[5]

What did the world have to offer in response to these demands and aspirations? There was a great deal of confidence in the United States and in some of the European countries that they had good governments and corps of able managers, and varying degrees of confidence about the replicability of good standards elsewhere. Faith that the developing countries could be helped toward better public management at a brisk pace depended on technique that was communicable and not so inextricably bound to national cultures that it was either inaccessible or a betrayal of national identity if adopted. I have already commented on the optimism about the possibilities of training that marked the American entry into development assistance. This faith that people could be taught, reasonably quickly and efficiently, to perform specific jobs was part of a wider faith that rational general principles of administration and organization were known.

I trust I need not review the rather peculiar American conceptions of public administration that had taken shape in the years before World War II[6] and were carried abroad by American foundations and others in the era of technical assistance. The remarkably sharp conception of distinction between policy and administration that our recent ancestors believed in made for easy confidence that one could introduce scientific methods of administration without intruding on the prerogatives of national sovereignty.

5. The Ford Foundation in India *(New York and New Delhi, January, 1955), pp. 85–86.*

6. *But it may help to recall a concise summary by Don Price: "This (American) approach . . . asked the administrator not merely to abstain from public participation in contests for power, but to avoid an interest in the substance of governmental programs. This approach, when followed in university programs of training for government service, turned out experts in managerial techniques—such as specialists in budgeting or personnel administration—far more success-*

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It also seems to me that the general conceptions of a modern industrial society that infused American social science in the years around the war provided a basis for thinking that there must be common features of the governmental bureaucracies of modern societies, whatever their cultural bases. Similar requirements of functional specialization in disciplined bureaucracies, with recruitment and advancement on universalistic principles of merit and performance, were to be assumed.

Foundation efforts toward governmental modernization have taken the forms of advisory assistance, the building of training institutions, and some more distant efforts to prepare future government officials by better university training. The first of these has come about in various ways—as the natural outgrowth of planning for indigenization, as a result of frequent requests for participation in administration reform movements, and in occasional ad hoc forms. One of the most notable examples came early in the Ford Foundation's work in India, when in 1952 we recruited Paul Appleby, then dean of the Maxwell School at Syracuse, at the request of the prime minister. His report, submitted some months later, was critical of much in the proud ICS and IAS traditions, and led toward the establishment of the Indian Institute of Public Administration.[7] The recourse to external expertise on administrative reform dwindles with the years, but it is by no means past; in 1973-74, for example, the Foundation supplied two full-time advisers to the Udoji Commission on salary and personnel policies in Nigeria.

Foundation assistance in the building of training institutions runs over a public-private range. Institutes of public administration firmly within or related to government service, like the Indian Institute just mentioned, have had a declining appeal. Combined training of managers for the public and private sectors has been encouraged notably in the Administrative Staff Colleges that came to be established at Hyderabad in India and Lahore in Pakistan. But the largest and now most favored approach has been one that started primarily from the efforts to train managers for industry. It has its prime expressions in the Indian Institutes of Management at Ahmedabad and Calcutta (to which the Foundation has devoted more than $7 million) and the Asian Institute of Management in the Philippines. These institutions began mostly training executives for national and multinational private industry under models and assistance from the Harvard Business School and the Sloan School of MIT. Later, they moved more to the training of managers for public enterprise, and, in further developments that will need more comment below, they have reached beyond the enterprise into questions of sector policy and planning. All of these institutions have had proclaimed functions in research and consultation that they have in varying degrees and quality fulfilled. A particular development in management consulting deserves mention. Building on experience in Turkey, the Ford Foundation has sought in several places to train cadres of consultants who would work in conjunction with management institutes and other nonprofit organizations. A notably successful group has been established at the Administrative Staff College, Hyderabad, that has had major Indian public enterprises as its clients.

Sector Management and Outreach

I shall have less to say about foundation engagement in sectoral programs of governments, not because they have been less important, but because a number of the relevant issues have already come under discussion in other contexts.

Foundations, like others, want to avoid trying to do everything, and hence have a strong tendency to focus on particular subjects or fields. Some of the choices of the major foundations have already

fully than it produced general administrators. A little later, in imitation of still more advanced developments in industrial management, the application of science to training for public administration came to include the use of psychology and sociology and cybernetics to deal with the morale of the workers, and the technical aspects of the decision-making process. But this approach, while it took a broader view of the concept of efficiency, still refused to deal with the policy objectives of the organization" (Don K. Price, "The Established Dissenters," Daedalus *[Winter, 1965], pp. 93-94).*

7. *For an interesting account of this mission, see A. H. Hanson,* The Process of Planning *(Oxford University Press, 1966), pp. 280-83.*

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been noted. The largest sectoral engagements of the Ford Foundation have been in agriculture, population, education, and social science research.[8] Agriculture and population are subjects that naturally relate to total populations, and we have had to look to the effective reach of national programs in them. The first major development effort of the Ford Foundation came in the community development program in India, which, as I have already pointed out, was as much or more a program for engagement of a total population in a national movement as it was an effort to improve basic economic conditions. Dissatisfaction with the impact of this program on agricultural production led to a new emphasis on the technology of agricultural production. This took the primary form of establishing international agricultural institutes —the International Rice Research Institute (IRRI) in the Philippines, the International Corn and Wheat Center (CIMMYT) in Mexico, and ultimately several others. It also led to a major sectoral program in agriculture in India, the Intensive Agricultural Districts Program, to which the Foundation devoted more than $10 million. This program involved complex and intimate working relationships with the Indian government at several levels and it became the largest single program in sectoral organization and management that the Ford Foundation has ventured. The international institutes represented in themselves a move away from governments of developing countries; they have been financed and staffed internationally, and are governed by international boards on which the host governments are represented but not controlling. But the products of these institutes in improved crop varieties and agricultural practices had to be diffused in many countries to be useful, and this outreach has involved extensive relationships with governments as the necessary steps were taken to introduce the new varieties and build the local research that has been necessary to cope with the many problems of local adaptation that inevitably arise. Programs of this sort have been financed by the Foundation in such places as Indonesia, Bangladesh, Egypt, Tanzania, Algeria, Tunisia, and Brazil. They typically reveal or foment problems of organization and management that can sometimes be dealt with directly by agricultural specialists, but at other times call for more wide-ranging attack. We have thus been led into programs to help countries build cadres of appropriate specialists—often agricultural economists—and sometimes to go beyond needs for trained manpower into building institutions that may cope locally with problems of policy and management. The need for institutions like the Center for Management in Agriculture that has been organized within the Indian Institute of Management at Ahmedabad has been increasingly felt, though the numbers of attractive ventures thus far have been few. The classic difficulties of governments in reaching effectively into traditional peasant agriculture have stimulated many pilot ventures, but effective organizations like the famous Comilla Academy in Bangladesh have been rare, and a great many of the problems of rural development remain unsolved.

A concern with agricultural or rural development thus leads strongly toward sectoral management and organizational problems that have been easier to perceive than to solve. But the sectoral focus permits a concentration of attention that gives better promise of significant results than broadside attacks on the functioning of whole governments, and the introduction of new technologies sometimes provides unusual opportunities for breaking out of old patterns. Similarly, the introduction of family planning programs has posed an abundance of organizational and administrative problems, but also a focus of effort and an opportunity to build afresh rather than simply struggle to change old habits.

The evident advantages of focusing on sectoral programs has in recent years led to strong arguments that foundations should confine their efforts in development management to such contexts, and

8. Health is notably absent from the list, since the Ford Foundation does not have programs in this field, except as they arise out of population interests or as nutritional interests that grow out of our concerns for agriculture and education; industrial and urban development have had some attention, but have not been as large and persistent as those sectors mentioned in the text.

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abandon the wider concerns I have described. The force of such arguments needs to be judged in the contexts of the new era that I now come to discuss.

FRUITS OF EXPERIENCE AND THE NEW ERA

After the enthusiasms and optimism of the years when development and international assistance were fresh and new, we have now come to a rather grumpy maturity. There is less sympathetic understanding between the developed and the developing countries, diminished confidence that outsiders can or will contribute usefully in what poor countries want to achieve. Even if the necessary will exists, there is growing doubt that we know what to do to bring about development. The swing of mood is no doubt more violent than a cool assessment of experience would justify, but the foundations have had to judge how they would respond to it.

The governments of developing countries are now certainly much changed, both in reality and in the ways they are perceived. The history of instability, coups, and repressions that makes much of the international news about these countries brings a wide spectrum of interpretation—from sympathetic apologia to disillusion and denunciation. At the least, it raises controversy and inhibits the easy cooperation that marked the beginnings of international development assistance. Currently the sharp revival of concerns over human rights and political repression—a movement by no means exclusively focusing on the poorer countries, but certainly including them—has put new questions about the legitimacy of close cooperation with governments.

On the other side, governments of the developing countries take much more reserved—indeed, sometimes suspicious or truculent—postures toward rich foreigners bearing supposed gifts. Disentangling the causal elements in their heightened reserve would carry us much beyond the needs and purposes of this paper. But among them are such diverse factors as growing self-confidence; the erosion of psychological dependencies that existed under colonialism and persisted in the first years of independence; aggressive nationalism that is in part a reaction to internal problems; and disillusionment with the effectiveness of aid and technical assistance. The temptation to radical withdrawal in these circumstances is obvious. Autarky or stern self-reliance has powerful appeal, but the costs are evident too, and demands for a new international order accompany critiques of the beneficence of what has existed.

The ideology of development and development assistance has been shaken by these changes. Indeed, it is now challenged in its essence by doctrines that make underdevelopment a condition of the rich countries' prosperity, and development assistance only a superficial and misleading corrective. The faith that mixed economies could evolve successfully in a hospitable international order has weakened, and radical critiques of what has been achieved in the name of development flourish both with the Third World and in the Western countries. There is pessimism about widening international gaps, indignant critiques of national governments as exploiting elites, and resistance to international investment as inherently exploitative.

To some of this, international development assistance has been able to respond with freshened egalitarian emphasis—on reaching the "poorest of the poor" in rural development, on the spread of basic education, or other programs that promise widespread benefits. The foundations have shared in these responses. But obviously difficult questions have been raised about the relations with governments that are characteristic of the past.

A loosening of relations to governments has certainly gone on. Patterns that used to be characteristic chiefly in Latin America are now common throughout the Third World. In the work of the Ford Foundation, there has been a sharp decline in the number of project specialists in technical assistance assignments with governments from more than a hundred at the peak in the late sixties to less than fifty in 1975.[9] A parallel decline has

9. Precise figures are difficult to supply because the statistical records do not distinguish between specialists assigned to government agencies and those assigned to universities and research institutes. Totals for recent years were as follows: 1973—105; 1974—85; and 1975—70.

also gone on in the number of advisers financed through the Harvard Institute of International Development and other means. Some of the decline reflects the reduced budget of the Foundation. But it has also been policy to reduce direct technical assistance as more trained nationals become available, and there has been a shared concern that the countries take full responsibility for their work.

The judgments involved in this decline of technical assistance to governments are often complex and difficult. The desire for disengagement is typically not one-sided. While the political posture of governments normally is to desire elimination of technical assistance at the earliest possible moment, there is often a sharp contrast in the desires of particular ministries and departments. We have, in fact, regularly to decline many requests for "old-fashioned" technical assistance. If we had the means, both financially and in the capacity to secure the necessary talent, the Ford Foundation could probably be fielding as many advisers as we did at the peak of our activity. Our resistance to continuing in the old patterns goes beyond the concern already mentioned that continued dependence on external advisers simply delays a necessary assumption of responsibility. In some cases, we do not think we could offer effective assistance in this way, or that our limited resources would have better long-run effects in being used for training, research, and other uses. There are also cases in which, because of the repressive and other features of a government, we do not think it proper to be intimately associated with this functioning.

None of this is to say that the role of foundations in technical assistance to governments promises soon to become obsolete, except perhaps in limited sectoral engagements. Its demise has often been prophesied, but recent revivals, such as our response to Egyptian requests for help in their efforts to open their economy to Arab and other investment, suggest it may still have considerable life. Estimates of the course of future action depend not only on political conditions but also on the prospects of making governments more effective agencies of development.

These questions now look difficult indeed, and we are less confident than we once were that the social sciences or tested practice offer ready means of dealing with them. Where indigenization has been needed, it has largely been achieved, and great progress has been made in strengthening the economic competencies of governments. But the quality of governmental functioning remains a source of great dissatisfaction in most countries, and the means of improving it look less obvious than they did when faith in training institutions was higher. The large investments made in the past decades in national institutes of public administration now are generally regarded as disappointing. Such has been the conclusion of an internal review we have recently made of our own experience in the Ford Foundation, and it is confirmed by other studies.[10] The reasons for this disappointment are numerous: we have found that often only small fractions of the services were in fact reached, and these not always the most promising fractions; hopeful expectations of research and consulting were slow to develop or were abortive; and prestige and authority were hard to attain for such institutions. Professional confidence in a transferable science of public administration that could be brought to these institutions (and also to public administration programs in universities) has withered, and critical study of the experience, as in the work of the Comparative Administration Group, has brought much improved understanding of the cultural impediments to easy transfer but has not supplied much that was readily usable in practical training. What has been hopefully labeled "development administration" has brought together new ideas and experience but has been easier to define as administration for developing countries than as a settled body of theory and techniques.[11]

10. *Bernard Schaffer, ed.,* Administrative Training and Development; A Comparative Study of East Africa, Zambia, Pakistan and India *(New York, Washington, and London: 1974), pp. vii, 445.*

11. *A convenient summary of conceptions on development administration may be found in Milton J. Esman and John D. Montgomery, "Systems Approach to Technical Cooperation; the Role of Development Administration,"* Public Administration Review, *Vol. XXIX (1969), pp. 507-39.*

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The experience with management training institutes has been distinctly better. Whether because of the lively demand for their graduates in industry, their insulation from bureaucratic politics, or the more ready transferability of the substance of their curricula, some of these institutes have attracted good talent and resources, and shown versatile capacity at dealing with the emerging problems in their societies. Their reach beyond private enterprise management into the public sector, and beyond the enterprise level to broader questions of sectoral development, is providing a type of resource for analysis and training for which there appears to be rising demand.

But the growth of governments in size and complexity has everywhere challenged resources of all sorts. With the socializing disposition of the governments of developing countries has gone great quantitative expansion, a rapid multiplication of public enterprises, and a general proliferation of the public sector. (One finds in various Ford Foundation reports, for example, that Nigerian government employment grew 60 percent between 1960 and 1966, the Kenyan government doubled between 1964 and 1970, and Peruvian civil service from 240,000 in 1967 to 450,000 in 1974.) The attendant difficulties have been many, with perhaps especially notorious weaknesses in the performance of public corporations. Even where great scandals have not occurred, we read that there is a lack of "conceptual clarity as to the primary tasks of the public enterprise" and that "the mechanisms and systems for assuring task performances do not exist in many LDCs."[12]

Even when faith in training is preserved, the enormity of the tasks of upgrading armies of civil servants and public enterprise managers makes foundations search for types of assistance other than massive frontal attacks. In some cases, it is possible to identify special deficiencies that the training of a few people to high levels can relieve. Such has been the significance of some of the training of economists, and other examples can be found in tax administration and the negotiation of foreign investments.

The improvement of functioning through better policy- and decision-making promises in general to be easier than reform of administrative standards throughout a government, or even a branch thereof. Much of the significance we attach to better economic competences depends on the impact of better policymaking, and we search for means of improving policymaking of other sorts. But, in other matters, the resources for better policymaking seem less ready at hand; the needs are more for research and analysis than for the transmission of tested results through training.

The challenge of building effective governments of the type most developing countries appear to want, namely, governments that have extensive control over their economies and are broadly socialist in character, is a challenge not readily met by existing models or by applied social science. It can indeed be argued that there is a profound dilemma in the development commitment of governments. By imposing formidable goals of social change, development commitment presses governments too hard. Lacking persuasive ideologies of limited government, they are condemned to reach beyond what their resources permit them to do effectively. Pathologies of malfunctioning—confusion, misrepresentation, corruption, exasperated resorts to coercion, etc.—then commonly appear. Studies of the way these pathologies arise are now fairly numerous and their multiplication under the aegis of well-regarded research institutes within the developing countries promises some corrective potential. But more is needed. Something approximating a fresh and general analysis of the roles of government in development is needed; an analysis that takes into account the organizational complexity of modern government and deals objectively with its strengths and limitations. At the present time, such broad subjects as the comparative study of economic systems appear to have had limited uses in the guidance of policy, and more specialized subjects are in less flourishing states than their practical importance for the developing countries suggests they should be. The study of public corporations is, for example, rather weakly developed

12. *Samuel Paul, "Public Administration and Public Enterprise," in Irving Swerdlow and Marcus Ingle, eds.,* Public Administration Training for the Less Developed Countries *(Maxwell School, 1974), p. 51.*

in most Western countries, even for their domestic institutions; only at Leeds, until the death of Professor A. H. Hanson, and very recently at Boston University do we know of systematic attention to public enterprises in the developing countries. The theory of organization has, of course, been much cultivated by social scientists in recent decades, but its application to large questions of governmental organization, both at home and abroad, has thus far been rather limited.[13]

Strategies for better organization and functioning of the public sector in developing countries thus cannot readily be conceived as a straightforward application of existing ideas and techniques. Our imperfect understanding points to the need for much patient empirical research on current problems in the countries. The means of organizing such efforts will probably vary considerably, but the management institutes appear to be one promising locus. They have the attractiveness to government of a technical, applied orientation, and, in a few places at least, they have up-to-date masteries of available technique. As in all applied work, there is danger of getting lost in particulars, so that cumulation of experience and building of theory may be inhibited. Linkages among efforts in various countries is one attractive means of stimulating wider views and has been a common focus of foundation attention. Some of these linkages need to be directly among the developing countries, but there would also appear to be attractive opportunities for links with the now burgeoning public policy programs in the U.S. and comparable programs in other countries. Public policy programs in the U.S. now have a narrowly domestic cast to them, but in approach and technique, they are similar to much sector planning and analysis in the developing countries. The opportunities for mutual learning are only beginning to be exploited, and the neutral, technical, and professional content of much of this work promises communication over barriers of politics and ideology.[14]

There is at least one other set of issues facing the governments of developing countries that deserves brief notice because it appears to be as fundamental as the problems of coherent organization and management of large public sectors that I have been discussing. This is the set of outreach and equity problems that we know as a source of profound criticism of many existing governments. Demands for decentralization of government and more attention to rural development have been insistent in recent years and have had much impact on the doctrine and practice of development assistance. But, as I have remarked earlier, the problems of effective governmental stimulation of social change in poor traditional rural settings are formidable indeed, and it is sometimes unclear if neglect is worse than clumsy or brutal effort. The need to find more effective and humane means of rural development is now a central need of development policy, and the promotion of research and analysis that may bring better and deepened understanding of the capacities and limitations of government in these processes is an essential element.

The modes of foundation assistance in these matters need to be carefully considered to avoid troublesome by-products. Insofar as governments

13. A recent judgment by Fritz Scharpf, director of the International Institute of Management of Berlin, may not be too severe: "After the demise of an explicitly prescriptive 'science of administration' which had . . . included the ministerial or departmental level in its search for principles of effective or efficient administration, the present body of empirically based organization theory is rooted primarily in behavioral studies in private industry and in public organizations for below the ministerial level. Until very recently, the organization and functioning of governmental departments and ministries have not been a subject of systematic, theory-oriented social science research; they were left to the concern of a descriptively-oriented 'institutional school' of political scientists, of ad-hoc inquiries conducted or commissioned by governmental agencies, and of some management consulting firms attempting to transfer the latest 'management by' fashions from private industry into the new market of governmental reorganization" ("Does Organization Matter?" [IIM, mimeographed, February, 1976], p. 3).

The November, 1975 newsletter of MUCIA's Program on Advanced Studies in Institution Building and Technical Assistance Methodology (PASITAM) remarks on agricultural development: "Principles and techniques from the field of organization and management are being applied. But there is currently no broad, explicit, systematic effort to harness knowledge of organization and management to the needs of peasant agriculture."

14. The vigorous beginnings of the International Institute of Applied Systems Analysis in Austria is an encouraging augury; it does not yet reach into the Third World, but it manages to sustain better East-West collaboration than is possible in many fields.

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and countries are open to the international world, their civil servants must be subject to temptations to seek statuses and rewards that would put them far above average standards of living in their countries, let alone the "poorest of the poor." Thus the professional advantages of international training, communication, and collaboration are gained at the cost of tensions with the leveling demands of serving poor populations. The management of these tensions must of course be a concern of national policies, and they are a principal reason for the jealous control of international contacts we now frequently encounter. External agencies like foundations have an obvious concern not to aggravate the tension unduly. One requisite is that the building of professional competencies be as compatible with future livelihoods as possible. This points toward the localization of training in the degree that it can be effectively done, and the reservation of international training to a few specialists, mostly at quite high levels. Economy generally dictates such a policy in any case, and a broad movement toward favoring local capacities for training and research has been characteristic of foundation efforts in recent years.

IN CONCLUSION

The spirit of this paper has been essentially conservative. I have stressed the great changes from the beginnings of the concern with development and developing countries to the present time, but then discussed what foundations are now trying to do in company with the governments of these countries on the presumption that they would keep on with these efforts. There are those who would take a different view, saying that we should get out of old habits and turn to something else. Sometimes, the judgment is that we haven't accomplished much and ought to cut our losses by quitting; sometimes there is the kindlier judgment that we have done some good but should recognize that the age of development assistance is passing.

We certainly need to ask if there is enough that is still persuasive in the idea of development assistance to provide a basic rationale for continuing foundation effort. When countries come to be perceived not simply as developing countries but as foreign countries capable of pursuing their own policies and interests, it is natural to ask if they are proper objects of philanthropy. There is often, of course, powerful reason for philanthropic interest in the people of a country rather than in its government. If the country has many poor people and seriously limited resources for improving their livelihoods, then the case for effort is strong. As we know, there has been a tendency in recent years for aid programs to follow this rationale, and foundations have found it persuasive too. Such aims involve loosening or circumscription of relations with governments, but cannot and should not eliminate them.

The case for a broader and continuing concern with the quality and character of government in what we still, somewhat uncertainly, call "developing countries" needs a somewhat different rationale. In part, the basis of such concern continues to derive from the need for development. Whatever the disillusionments of recent years, countries still seek progress in independence, and governments are still looked to as the most important agencies of development. Moreover, the quality and effectiveness of government cannot be a matter of indifference internationally. It is painfully evident that a great many of the domestic troubles of countries around the world derive from the malfunctioning or incompetence of governments, and these troubles provoke international tensions and disturbances. There is currently a stronger disposition to criticize Third World countries for abuses of freedom and human rights within their borders. But the correction of such abuses requires competent and secure government at least as much as direct pressure to respect humane standards.

Whether or not it will prove possible for foundations to contribute significantly to the improvement of government in the new era will take time to assess. The tendencies in our work have been sketched in this paper, with emphasis on the decline of direct technical assistance, a more critical and selective approach to training, and a rising concern for research and analysis. At the outset I pointed out the concern of foundations to be at once philanthropic and research-minded, and in practice it is

not always easy to be both. The aims of benefiting human welfare in ways that try to get at the roots of problems often lead along uncertain and diverging trails. Human affairs are not yet to a point where we may confidently envisage an orderly sequence of research and analysis leading to policies and their translation into effective action. Foundations thus regularly find themselves trying to balance pulls toward research and action programs, and work with the governments of developing countries shows all the familiar difficulties of choice. In the latter part of this paper, I have dwelt upon the large deficiencies in our understanding of effective means for public management in developing countries. Both within these countries and outside them, there is evident need for fresh ideas, research, and technique if better governments are to be built. Present tendencies for foundations to concentrate attention on the research and analysis capacities within the developing countries seem proper to continue on these matters as on others. In future, the balance thus seems likely to fall more toward such activities than to the direct engagement with building governmental structures and action programs that had a large place in past agendas. There is undoubtedly some loss of excitement and sense of importance in this shift. But there is also a protection against the hazards of unwise intrusions that is welcome when we have come to more modest assessments of what may be offered. And finally there is the satisfaction of sharing in explorations in which there is ultimate uncertainty as to who is teaching and who is learning.

B

Administrative and Economic Program Review - East Africa

Draft

March 4, 1977

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Administration and Economic Planning Program Review - East Africa

INTRODUCTION

For the past fifteen years, the Foundation's largest programs in eastern Africa have provided advisory services to governments in the fields of public administration and economic planning. Now, for a number of reasons, the focus is shifting to other fields, with less reliance on expatriate advisors and less intimate association with governments. The last resident advisor has been withdrawn from Tanzania, Kenya and Zambia, though a group of Foundation staff in Botswana continue an advisory program modelled closely on the East African experience.

When winding up a major program such as this, the Foundation customarily reviews its efforts, recognizing an obligation to account for and evaluate the use of tax-free funds abroad. The review process has management objectives as well; it is a method of sharing experience among staff in various parts of the world, of identifying flaws in operational methods, and sometimes of spotting loose ends which should be dealt with before moving on. Broadly, the backward look is a way of learning about the development process from the experience.

In this case, the exercise has added interest because the two principal countries involved, Tanzania and Kenya, have chosen radically different social and development strategies. Indeed, the contrast between them has attracted much scholarly attention, a fact which makes possible a somewhat broader review than one based largely on program documents.

The anticipated emergence of Namibia and Zimbabwe in southern Africa also lend a potential significance to the review process. The Foundation may be called upon to decide how much of its eastern African experience it is prepared to help replicate in these states.

Program dimensions. The specific program actions which this review is meant to cover are the following Delegated Authority Projects (DAPs):

#639-0290 - Project specialists and consultants on economic planning in eastern Africa

Allocation (1963-1976) $ 3,606,000

#649-0420 - Project specialists and consultants on public administration in eastern Africa

Allocation (1964-1976) $ 2,450,000

#709-0139 - Project specialists and consultants to the East African Community

Allocation (1970-1976) $ 671,000

These projects supported approximately 172 man-years of resident advisory staff whose local logistical support costs were borne by the East African office budget. These costs amount to an additional $1,500,000, approximately.

This, however, is not the full picture. Some DAPs, totalling $2,362,000, supported related activities, such as the first three years of the public administration program in Tanzania and final expenditures of the three main projects which were combined into a Public Management DAP in 1974 for administrative reasons. Parallel advisory efforts in Botswana were first funded under DAP 649-0420, but then spun off into a separate, but related DAP.

In addition, grants totalling over a million dollars were made in support of planning and administration program objectives; eg. for building a Civil Service Training Center in Dar es Salaam, for holding the Kericho Conference in Kenya, etc. Related grants and DAPs are listed in Appendix A. They are not evaluated here, but they contributed directly to the programs under review. It can be seen that the total cost of the Foundation's work in these fields since 1961 in eastern Africa was more than $10,000,000.

For this review, it is useful to note the breakdown of direct advisory costs in economic planning and public administration between Tanzania and Kenya:

	Tanzania	Kenya
Economic Planning	$ 1,173,000	$ 1,924,000
Public Administration	1,530,000	995,000
Totals	$2,703,000	$2,919,000

(Advisors stationed in Arusha to assist the East African Community organizations are excluded from the totals.)

Methodology and Limitations. Having sketched the broad purposes of a terminal review, and described the dimensions of the programs to be considered, one must hasten to describe the way the review has been carried out and the limitations which are inherent to the process.

The bases for the review are experience, the files, published material, and a limited number of interviews with participants, government officials and knowledgeable observers. My experience consists of having served as assistant representative of the Foundation in East Africa from 1963-67, focused on Tanzania in writing two papers while at Harvard the following year, and revisited Nairobi and Dar es Salaam for two weeks at the end of 1976. The files contain periodic program justification documents (requests for supplements), formal program review documents, and an incomplete set of terminal reports written by departing project specialists. The published material on eastern Africa is enormous; that which I have been able to consult is listed in the bibliography. A list of interviewees, one I still hope to extend, appears in Appendix B.

The limitations of the exercise will be seen to be considerable. Most regrettable is the comparative lack of attention to Zambia. I was unable to visit Lusaka or to see the principal architects of our program there, David Anderson and Allan Simmance, so this part of the

program, a successful and important part, will be relatively neglected.

Similarly, the work in the East African Community is inadequately treated. This is less damaging, perhaps, because of the declining climate for East African cooperation and the limited relevance of the project for other regions. Still, John Scott's work as director of economic research and planning for the Community was of unusual quality and influence and deserves more adequate treatment.

Good social scientists, these days, declare their values at the outset. My biases will perhaps become clear below, but I should say that over the last few years, working in the Middle East, I have become strongly impressed by the importance of cultural factors in the development process. This will affect my choice of examples and my approach to planning and management issues. The result is a more personal than technical assessment of these programs, and I have consequently chosen to call it a review rather than an objective evaluation.

Previous reviews. This is far from the first review to be made of these programs. In addition to the annual program report by the representative, and the frequent restatement of results and objectives involved in requesting supplemental funds, periodic reviews were made by staff consultants throughout the fifteen-year period. The first of these was Operation Janus, an intensive analysis of program objectives and activities conducted by each field office of the Foundation in 1966. In 1970, a rather elaborate African Program Review was conducted for the Board of Trustees, with contributions from program staff in New York and the field offices. Also in 1970, the economic planning program in Kenya was reviewed by Ben Lewis and Edgar Edwards, and in Tanzania by Lewis and Gerald Helleiner. J. Donald Kingsley and John Thurston, whose consultant report gave shape to the original public administration program in Tanzania in 1961, returned ten years later for a subsequent assessment. In 1973, a staff conference in Dar es Salaam examined the planning and administration programs

with a view to changing directions towards a public management program.

These efforts give evidence that, although advisory assistance was popular with the governments of the region and generally regarded by Foundation staff as being of good quality, there was no tendency to complacency, no routine continuation of the projects simply because they were functioning satisfactorily. Indeed, the strongest criticism of the Foundation's restless process of program review is from Allan Simmance who felt that in recent years intense Foundation self-scrutiny has led to a distraction of energies from the work at hand and the premature abandonment of still vital work. This is a topic to which we will need to return later.

PROGRAM DESCRIPTION

Foundation strategy. The Foundation began serious work in Africa in the late 1950s only after some years of development work on the Subcontinent and in the Middle East. Prior experience naturally had an important influence on the fields in which its work in Africa initially concentrated. Broadly speaking, governmental modernization and the building of educational institutions and systems were considered to be matters of high priority to newly independent countries and fields in which the Foundation had demonstrated conpetence.

The large investment made by the Foundation in India in the 1950s in community development programs was less well thought of, with the result that projects in rural development and agriculture, as well as community development, were not featured in the Africa programs for some years. This did not reflect a lack of interest in rural development on the part of the Foundation, indeed Forrest F. Hill, the then vice-president in charge of overseas development programs was an agricultural economist, but a new strategy was needed which would offer greater chances for success than community development projects and agricultural faculties in universities. During this period the Foundation joined the Rockefeller Foundation in building IRRI, setting a pattern of investment in technology development which has generally been adhered to since.

A fourth program category which in recent years has been a prominent feature of the Foundation's work is population, but in Africa at the time of independence that was a subject far from the minds of its leaders. Development work in Africa, therefore, focused initially on education

and government modernization, of which only the latter program is the subject of this review.

In retrospect, the Foundation's strategy in working with governments in East Africa has a clarity and coherence that masks some of the groping uncertainty that was felt at the time. The first and obvious task was to assist the newly independent African governments to assume effective control, i.e., to indigenize their civil services without unduly damaging their effectiveness. The second task was to help these governments realize their egalitarian objectives by shifting more attention to developmental activities; and the third was to devise methods to improve the functioning of governmental services, particularly those of a developmental character.

These three strands of strategy correspond roughly, but not exactly, with the public administration DAP (649-0005), the development planning DAP (639-290), and the public management DAP (749-0828) which superseded the other two.

The Foundation's strategy coincided with, and to a large extent was in response to the priorities of the governments themselves. African leaders wanted first to take genuine control of the state institutions, which meant rapid Africanization of key positions; then to gain control of their economies, and to spread the benefits of political and economic independence to their people through development programs.

There was thus general agreement on long-range goals between the governments and the Foundation, but there was an important difference in time perspective. Governments are responsible for the course of day-to-day events, and hence often have a rather short-range time horizon. The Foundation, lacking such responsibility, has the leisure, and in some cases its staff have the experience, to take a somewhat longer view. In practice, this often meant that Foundation staff were generating activities in advance of the emergence of genuine demand for them from the governments. In some cases Foundation staff anticipated future demand correctly, and in some cases wrongly, but the difference in time perspective explains why, despite the coincidence of overall objectives, the Foundation's activities were not always limited to

responding to governmental requests.

Africanization in Tanzania. In 1958, J. Donald Kingsley served as a consultant on civil service staff development in Nigeria. Shortly thereafter he became the Foundation's representative in West Africa and initiated a program strongly oriented to public administration advisory services and training. In 1961, just before Tanganyikan independence, the chief secretary invited Kingsley to consult on the means of nationalizing the public services. Kingsley, and John Thurston of IIE produced a report which sent shock waves through the expatriate-dominated civil service of Tanganyika.

The public service was at the time described as consisting of "African ministers and African messengers with a thick sandwich of Europeans and Asians in between." (Janus) The expatriates were aware of the meagre numbers of Africans possessing the educational basis to master the skills of running the bureaucracy, and naturally assumed their services would be needed for many years to come. (Tanganyika had less than 100 university graduates and less than 1,000 secondary school leavers at independence.) But the Party members (TANU) and labor union leaders who had done much to advance the date of independence demanded the replacement of the expatriates who they saw as symbolizing the colonial past.

Kingsley and Thurston recommended a program of orderly, but rapid, transition which would involve supply and demand analyses of skill requirements, identification of key expatriates for retention, restructuring of departments to accommodate available skills and concerted efforts to focus training programs to meet needs of the highest priority. To help design and implement this program a staff development advisor, (David Anderson) and three job analysts arrived in Dar es Salaam in 1961. Anderson's first step was to suggest the appointment of an Africanization Commission headed by a Minister, for the purpose of undertaking a detailed study of the staffing position and the training needs of each Ministry. This took the political

heat out of the Africanization issue and allowed Government to identify those expatriates it needed to retain beyond their contract expiration dates, and even to recruit new people on the basis of functional requirements.

Anderson and his team were able to assist the Government in beginning to build a viable public service through such steps as centralizing control of the Civil Service in the Office of the President, making horizontal and vertical studies of the operating requirements of Ministries and reshaping organizations to take account of the limitations of the local labor market, studying training resources and shaping training to job requirements. In addition, a Civil Service Training Center was established, largely with Foundation funds and initiative. The CSTC is still turning out over 400 trainees per year in executive and clerical grades, and the Government believes its capacity should be doubled.

In 1962, shortly after independence, a Foundation consultant, George Tobias, arrived in Tanzania to undertake a survey of high-level manpower requirements and resources. The report, published in August of that year, attempted to make a rather precise estimate of the post-secondary level skills then employed in Tanzania and the likely need for additions and replacements over the ensuing five years. The most important recommendation of the study, however, was that a human resources secretariat be established as an integral part of the economic planning process. The government immediately accepted this recommendation and asked the Foundation to recruit a manpower advisor to help establish what became the manpower planning section within the Ministry of Development Planning.

The expert was the late Bob Thomas, a straight-talking ex-U.S. Department of Labor employee. Thomas was not highly trained in statistics, nor did his methodology excite the envy of the theoretical writers on manpower planning from the economics profession, but his work soon attracted President Nyerere's attention. Thomas and his colleagues formulated and gained Governmental acceptance of a set of basic policies to guide the manpower program. Some of the more important of these policies are the following:

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- A target date of 1980 for essential self-sufficiency at all skill levels of the economy;
- Secondary and higher education to be given first priority in the government's educational investments;
- Higher education investments to be geared to manpower requirements;
- Government bursaries (scholarships) to be allocated on the basis of the manpower requirements of the economy;
- Foreign bursaries to be directed only to supplying skills for which training was unavailable in East Africa;
- Students receiving bursaries to be required to work one year for the government for each year of post-Form Four education.
- Methods to be sought to increase the usefulness of existing skills;
- Expatriates to be recruited to bridge serious gaps.

A number of special programs were devised to accelerate the supply of skilled manpower and to ensure that those expatriates who would be welcome beyond the expiration dates of their contracts would be given advance notice of this fact. The localization effort was focused almost exclusively on government positions for the first four years of the program. Only in 1966 was there a serious attempt to launch a localization program for the private sector; prior to that time the demands of government for available trained people were too great to permit their diversion.

The manpower program quickly assumed unusual importance in the Tanzanian planning process. President Nyerere took a personal interest in it and often declared that the shortage of trained manpower was the principal constraint on Tanzanian development. In introducing the 1964 Economic Plan to Parliament, the President began with a strong endorsement of the manpower program. He also requested and received each year until 1974 an annual comprehensive

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report on skilled manpower development in the country.

Thomas remained in his post until 1970 when he transferred to Nairobi to become the regional program advisor on manpower in the East Africa office of the Foundation. At the time of his departure he was able to take considerable satisfaction in the program. A Tanzanian successor, Mr. Henry Okulu had been given three years training at Foundation expense in the United States and had worked for a number of years in close association with Thomas. The number of Tanzanians occupying middle and high-level positions had increased from 19% at the time of independence to 70% by 1967.

The Tanzanian manpower program achieved a considerable international reputation. It was selected for a special case study by the International Institute of Educational Planning in Paris, and delegations from various countries visited Dar es Salaam to view its workings. It was generally considered to be the most advanced manpower program on the African continent. In 1968, Bob Thomas offered the opinion that the 1980 goal of manpower self-sufficiency would be met.

There was less satisfaction with the results of the work of the job analysts on improving the utilization of existing skills. Although four competent analysts had been employed from two to four years each and then had submitted comprehensive reports on the Ministries of Agriculture, Communications, Works, Local government and others, the Ministries concerned seemed reluctant to take remedial action. In one case, one of the analysts was assigned to a Ministry for a full year to assist in the implementation of the report, but at his departure he felt that little had been accomplished because the Ministry was basically uninterested in the objectives of the program.

In the analyst's opinion, the expatriates within the Ministry who controlled the key technical and professional posts were most resistant to change, but he also found fault with the methodology employed in the program. The studies generally originated outside of the ministries

concerned and were conducted by people who did not know the ministry staff on a personal basis. The studies tended to be rather formal and somewhat critical of the existing situation and this naturally produced defensive reactions. He suggested that a manpower services organization should be created to offer a broader range of advisory services to ministries at their request. These services would include personnel management, organization and method studies, work-measurement studies, manpower planning, and management reporting and control procedures.

The staff development function remained vital and sensitive even after David Anderson's transfer to Kenya, where he took on a similar task. He was replaced in Tanzania by Edward Rubin, an American with a business management background, and later by Frank Glynn who had many prior years of experience in Tanzania. The functions of the task changed somewhat from the initial emphasis on Civil Service legislation and procedures to more specific administrative reforms to meet changes in government requirements. There is no doubt that the occupants of this position significantly affected the development of the new public service in Tanzania as in other eastern African countries where such posts were created and filled by Foundation-supplied specialists.

Economic Planning in Kenya. As the East African countries were approaching independence their second major concern, after the problem of finding the means to take effective control of government, was the development of their societies. World Bank missions to each of the three major East African territories made in their extensive and influential reports a strong case for establishing economic planning systems and project development units.

In the summer of 1962, Professor Ben Lewis of Oberlin College visited East Africa as a Foundation consultant and received inquiries from all three governments about the possibility of the Foundation's supplying economic advisory assistance. The only firm request, however, was from Kenya. The government was by no means convinced that it wished to establish a planning process at the time as was indicated by their initial response to the

submission of Edgar Edwards' curriculum vitae. Treasury replied that Edwards was a bit more senior a man than would be needed for what they had in mind. Edwards accepted the post nevertheless and arrived in Nairobi in August 1963.

At the time the Foundation agreed to supply this advisor, it felt that first attention should be given to the work of the East African Common Services Organization (EACSO) to which a grant of $45,000 for economic consultants had been made in November 1962. Supplementary to this regional focus, the Foundation anticipated that it should be prepared to offer limited high-level assistance to the planning agencies of the three countries.

Within six months of his arrival, Edwards had convinced both the Kenya Government and the Foundation that a substantially greater effort than either had anticipated was necessary or at least desirable. A rather rudimentary 6-year plan was produced in early 1964 by Edwards, Oliver Knowles, a Treasury official, and Michael Roemer, an M.I.T. Fellow in Africa. It was anticipated when this plan was adopted that it would be superseded by a revised plan once more economic planning competence was available and following greater elaboration of the policy objectives of the Government. Work on the revision had already begun before the 6-year plan was published. The first plan proved useful in negotiations with potential donors, which was the original government impetus for the exercise, but it also provided a framework for ministers and permanent secretaries to define their work and coordinate their efforts with other ministries. Most importantly, a Development Committee of the Cabinet, which had been established before independence, became an active forum in which major economic issues could be discussed by the effective decisionmakers.

In July 1964, a new Directorate of Planning within the Treasury was officially established with Edwards at its head, an arrangement which made the Foundation's representative distinctly uneasy. It was one thing to provide advice on economic planning issues, but for a Foundation employee to be responsible for the planning mechanism was outside the boundaries of its own definition of its assistance. There is also some question about the legality of supplying foreign countries with a

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person in a position like this under the American tax law governing philanthropic assistance. This potential difficulty was overcome when Kenya became a republic on the anniversary of its independence, and a Ministry of Economic Planning and Development (MEPD) was created. Edwards became senior advisor to the Permanent Secretary of MEPD and, in mid-1965, he left Kenya to return to Rice University.

The creation of a separate planning ministry was typical of many newly-independent African governments. Resentment of the Ministry of Finance, or the Treasury as it was commonly known, was widespread among the new leaders because it was seen to be an obstacle to development. The creation of a new ministry, with a degree of autonomy from the purse-string mentality of Treasury officials, was thought to be progressive; besides, it was popular with the Bank and other donors. This mood lasted less than a decade, however, and most countries have not recombined planning with finance.

By the time the Ministry was created, a staff of five Foundation advisors was working on planning in Kenya: three Americans, one Dutch and one Swedish. The first Minister was Mr. Tom Mboya whose remarkable intellectual capacity and leadership skills added greatly to the impact of planning in the country. Philip Ndegwa joined government as a planning officer at about the same time.

In 1965, the Kenya government proposed and Parliament adopted a far-reaching policy document entitled Sessional Paper No. 10, African Socialism and its Application to Planning in Kenya. Much of the first draft of this paper was written by Edwards, a fact which has since aroused critical comment in some foreign publications, but before it reached Parliament it was intensively reviewed and revised, first by an informal group chaired by Mboya with Kibaki, Ndegwa, Knowles and Edwards as members, and then by the Ministers sitting in the Development Committee. Sessional Paper No. 10 summarizes Kenya's objectives as follows:

1. Political equality.

2. Social justice.

3. Human dignity, including freedom of conscience.

4. Freedom from want, disease and exploitation.

5. Equal opportunities.

6. High and growing per capita incomes, equitably distributed.

To some extent, the document represents the Government's answer to the insistent voices in Parliament, led by Oginga Odinga and Pia Pinto, demanding more radical social change. The Sessional Paper sought to elucidate its philosophy that dignity, justice and equity need a firm basis of economic growth.

At the same time an extensive revision of the original 6-year plan was underway and a number of important policy issues were examined including such key social policies as family planning, primary education and anticipated employment problems.

By this time the Foundation's objectives had obviously broadened beyond assistance in drawing up a plan to attract donors' investments. Economic decision-making was recognized to be a critical task for new governments staffed by leaders who had had little opportunity to gain training and experience in the field. The Foundation's advisors were clearly making important contributions by helping establish sound procedures for the consideration of development projects and by advising on economic policy. The planning process was seen to be a continuing activity which would require competence unavailable locally for several additional years. The need for additional attention to plan implementation procedures, provincial and district planning and Ministry level planning was also recognized.

Also at this time, the demand for Foundation assistance in planning was spreading in other countries; in early 1966, Tanzania, Uganda, and Zambia requested senior economic advisors. Although the Foundation began recruitment for all these positions, the program in fact spread only to Tanzania at that time. In Uganda, the Chief Planning Officer decided he required an economist from a socialist country, and in Zambia a senior economist supplied by the U.N. was unenthusiastic about another senior person arriving under different auspices. (Curiously, the Ugandans recruited a Polish economist, Lissovski, who had been a Ford Fellow in the United States. He was a very

able planner but, unfortunately, he died in the middle of his assignment.)

In Kenya, the combination of Mboya's dynamic and effective leadership and the concentration of economic competence in his Ministry made planning a force in Government which commanded the respect but sometimes also the envy and resentment of other ministers and civil servants. Their response to this imbalance took several forms. Perhaps the healthiest, from a developmental point of view, was to seek to develop planning competence in their own ministries, a process strongly encouraged by Mboya and his advisors. The Ministry of Agriculture sought to build up a strong internal planning unit with advisors from a variety of donors, one of whom was supplied by the Foundation. The effort enjoyed only limited success at the time and a new attempt, which will be discussed later, is currently underway.

In another case, the Minister of Education requested the assistance of planning in drafting an educational policy paper without the concurrence of his own permanent secretary. This led to a struggle which went all the way to the President of the Republic before it was resolved and the draft policy paper was scrapped.

In late 1967, the Development Committee of the Cabinet was abolished. One can only assume that this move was made in order to curb the power of Mboya and the MEPD. Thereafter, although chapters of subsequent development plans were discussed with appropriate ministerial staffs, and plans were approved by Cabinet, there was little serious discussion of critical economic issues in the plans by economic ministers as a group.

Perhaps the key ministry to successfully resist genuine participation in planning was the Ministry of Commerce and Industry. To this day, there is no effective professional planning and project evaluation unit in this Ministry. Major industrial investment decisions have, however, had to receive approval of MEPD and the Treasury, so cost benefit analysis has not been wholly omitted from the industrialization effort.

Another serious disappointment to the planners was the failure of an attempt to institute cooperation between the private sector and the government through the Planning and Development

Advisory Committee (PADAC). PADAC met occasionally in early years but its meetings were generally unproductive.

There is no question but what the meaningful planning activities of the government in the first few years after independence were essentially conducted by expatriate staff and advisors. Several excellent young Kenyan economists, notably Philip Ndwega, Harris Mule, the late Serjit Heyer, and Parmeet Singh, participated in the work and rapidly gained competence in the process. But the systematic professionalization of the planning process and the development of Kenyans to staff it could be said to have started only in October 1968, when a scheme of service for economists was inaugurated. This established a governmental career ladder for economists, statisticians, and planners which paralleled the path of advancement of other career civil servants. In 1971 there were 51 established posts in the economic service, apart from economists employed by parastatal corporations, but MEPD estimated that the actual requirement per government economist was 73. Only 25 qualified local officers were available for these posts.

The minimum entry qualifications for the economic service was an upper second-class honors degree in economics or statistics or its equivalent. In order to enlarge the pool of qualified entrants, the Foundation supported the creation of a Bachelor of Philosophy (B. Phil.) program at the University College Nairobi in 1969. (690-0156) This was a one-year postgraduate program requiring at least a year of relevant government experience before admission. The content of the B. Phil. Program was specifically geared to the development problems facing the Kenya government. For several years the Economics Department at the University was cool to what they regarded as an excessively "applied" program, but it is now well-integrated and this year for the first time masters degree students and B. Phil. students are taking the same course of instruction with the masters candidates remaining at the University for an additional year.

More recently an agreement has been worked out with the Canadian government under which 6 to 8 members of the Economic Service are offered masters degree scholarships to

York University in Toronto each year. By 1979 it is anticipated that between 30 and 40 Kenyans will have received York MA's.

The assassination of Tom Mboya in the summer of 1969 was a tragedy of great national importance which also set back the growth and development of the planning process in Kenya. Indeed, it is notable that after a period of shock and suspended progress, planning not only survived but has continued to play a leading role in affecting the course of Kenya's development.

Development Planning Review of 1970. At this time Edwards, who by then had served as an advisor to the government for four years and was on the Foundation's staff in New York, and Ben Lewis who had also joined the Foundation on a full-time basis, undertook a comprehensive review of the planning process in Kenya. They described the Foundation's basis objective as "to assist substantially in the establishment of a lasting, effective planning process, indigenously staffed, widely spread and used throughout government", and found it to be an objective broadly shared by the Kenya government. The report notes that the Government's initial objectives in seeking Foundation support were considerably more modest but implies that the Foundation had the grander design in mind from the beginning. In fact, as we have seen, the Foundation's objectives also evolved from more modest aspirations, although Ben Lewis may have had the larger picture in mind ever since his pre-independence visit.

Despite the importance which planning had achieved in Kenya's economic decision-making, Edwards and Lewis noted that enthusiasm for the process was still limited in a number of important ministries, and the extension of the influence of planning to the private sector and local levels of Government was disappointing. The attempt to create a provincial planning apparatus, although supported by advisory and financial assistance from a number of bilateral donors, was swimming upstream because of increasing centralization of financial responsibility for secondary roads, primary education and health centers.

Manpower planning, in which three Foundation-supplied advisors had been involved, was also cited as a disappointment in terms of its influence in shaping university development,

vocational training, in-service training, and plans for foreign educational opportunities. The development of parastatals (public statutory bodies) and municipalities was also occurring essentially outside of the planning process.

Despite these shortcomings, the team found much satisfaction in the evolution and acceptance of the planning process in the first six years of Kenya's independence. The report made a clear recommendation for continued Foundation involvement with planning in Kenya through the decade of the 70's. It suggested that at least 6 advisors would be needed through the then current plan period which would take them until 1974, and made the case for advisory assistance to many ministries and to provincial planning units. It identified several positions for priority Foundation attention: these included advisors to the Chief Planning Officer or Permanent Secretary; economic service staff development; project and program budgeting; economic policy in the Treasury; provincial, district and municipal planning; human resources; economic management in the Ministry of Public Works; and industrial development in the Ministry of Commerce and Industry. The report strongly recommended more intensive effort in providing in-service training to counterparts. These recommendations were discussed with key Government officials in draft and final form.

Both the Government and the Foundation responded favorably to the recommendations of the report but in practice the Foundation decided to curtail its supportive planning in Kenya more rapidly than was recommended. The number of advisors was reduced to three in mid-1973 and to one in late 1974. The final advisor, Edwards himself, who had returned for a third tour, left the Ministry in the summer of 1976. The accelerated withdrawal was motivated by a sharp decline in the Foundation's overall budget and by a general decision to curtail advisory assistance around the world. The latter decision was of course largely but not exclusively prompted by the overall budget decline.

A description of this program would not be complete without a word about the character of the relationships between the advisors and the Foundation, and the advisors and the

Government. The Foundation has had a general policy that the professional loyalty of an advisor assigned to a government is to the government itself, and that no matters of a confidential nature are expected to be divulged to the Foundation's representatives. This policy was strictly adhered to by Edwards and subsequent advisors, a fact which continues to be fully appreciated by the Kenya Government. In addition, the advisors supplied by the Foundation were not considered to be a team and, although there was often a recognized senior economist among them, there was no team leader designated. Throughout the life of the program, no professional meetings were held in which only Foundation advisors were in attendance, and no attempt was made to coordinate the views or advice of the advisory staff.

In all, seventeen economists and one anthropologist have been provided by the Foundation as planning advisors, most of them to the MEPD, for periods of two or more years. Seven were non-Americans. They served a total of 48 man-years.

Public Administration in Kenya. In July 1963, shortly after the Foundation opened its East Africa office in Nairobi, the Kenya Government requested advisory assistance on staff development and manpower planning. The formal request specifically alluded to Tanzanian experience and suggested that appropriate candidates for the staff development position might be found among former colonial civil servants from West Africa. Two such candidates were suggested by name by the Director of Personnel.

Having examined the backgrounds of the two proposed candidates ,

the Foundation declined to offer them appointments because they appeared to bring little talent that was not already available among colonial officers who still controlled most of the senior posts of government. Finding an alternative who had the necessary understanding of the system was far from easy, however. It finally decided to ask the Tanzanian Government if it would strongly object to the transfer of David Anderson to fill the post. The Tanzanians were not pleased, but acceded to the suggestion with the proviso that a replacement be found for Anderson.

The program Anderson initiated in Kenya had basically the same objectives as the one in Tanzania but required somewhat different tactics due to a different political and constitutional situation. Essentially he sought to clarify policies concerning the civil service, to stimulate the development of institutions and traditions on which to build a viable national service, to focus training activities on priority needs and to rationalize the use of available manpower.

A comprehensive staffing survey was undertaken in all ministries, and policies toward non-citizens and non-African citizens were clarified. A listing of key expatriates was made, a matter of some urgency for both the expatriates and the Government, and efforts were made to ensure their retention. Procedures were established for the allocation of secondary-school leavers and a committee was appointed to review the training program of the Kenya Institute of Administration.

The Foundation recruited several additional advisors to assist in implementing this program. One, attached to the Ministry of Education, helped establish a central registry of students abroad; another helped computerize personnel records; and a third, the former Executive Director of the U.S. Civil Service Commission, worked on creating a management services unit in the Directorate of Personnel.

Their positions were conceived by Anderson and requested by Government, but it is clear that not all the Kenyan officials responsible for the units to which the specialists were assigned were wholly convinced of the priority of these particular tasks. The central registry of students never became operable due largely to indifference to the project in the Ministry of Education, but fortunately the project specialist assigned to the task could be diverted to the more rewarding work of preparing for the Kericho Conference on Education, Employment and Rural Development and editing its results for publication.

Similarly, Warren Irons felt deeply frustrated in his attempts to organize a management services unit. On his departure Irons expressed gratitude for congenial working relationships with the Kenya Government and with the Foundation's staff and said he appreciated the quality of the weather in Kenya but suggested that

he should not have been invited to accept the assignment. He said the idea came from the Staff Development Advisor, and the Director of Personnel in office at the time of the assignment had no conception of what a Systems Analysis and Staff Utilization Unit should be or should do. He felt that such a unit should organizationally have been located in the President's office, that it should not have had a non-African head, and that in general no Africans were at all interested in the idea. Having here revealed the depths of Irons' disenchantment, one cannot defer mentioning until the section of this paper on program outcome that the management services unit which Irons labored diligently to create is in fact functioning, staffed by seven Kenyan officers, and in such demand by other departments of Government that consideration is being given to doubling its size. The current Director of Personnel, Mr. J. Gethenji, credits Irons fully for creation of the unit and regrets that qualified counterpart staff were not available to work with him when he was in Nairobi.

Manpower planning also began in 1964 with the arrival of an analyst to do the initial survey. In all, four specialists worked seven man-years on manpower programs between 1964 and 1969. This activity never attained the prominence in Kenya that it received in Tanzania for a number of reasons. The Kenyan economy is much more complex and the private sector much larger, so the problems of accurately forecasting high-level manpower needs were considerably greater than in Tanzania. Secondly, Kenya had many more trained people at the time of independence than did Tanzania, so the urgency of manpower development was less pronounced. Certainly the rare personality of Bob Thomas had much to do with the success of the Tanzanian effort but, so far as I know, the quality of work in Kenya was also at a high professional level.

It was unnecessary for the Foundation to establish a government training institution in Kenya because a number of such institutions already existed. The most important was the Kenya Institute of Administration (KIA) which was generously financed by British aid and AID. The Foundation did make three teaching staff appointments to KIA from 1965 to 1972 but perhaps the main

program impact on the functioning of the Institution came from the Adu/Anderson review of course content and the subsequent establishment of an advisory committee to coordinate its offerings with the needs of Government.

The Foundation also cooperated in minor ways with the new East African Staff College, a largely British-financed and run program which sought to dilute its origins with a tincture of American philanthropy.

From time to time the Foundation supplied consultants or project specialists to facilitate the staff work of special investigatory commissions in Kenya. John Seal, for example, was the principal staff man for the Ndwega Commission which undertook the most far-reaching revision of public service rules which has occurred in independent Kenya.

A good example of the kind of service provided by consultants concerned the work of an educational salaries commission in 1967. Teachers were demanding substantial salary increases and members of the commission, having toured the country taking evidence, were inclined to be sympathetic. A consultant specializing in labor economics was able to draw attention to such factors as wage earner/farmer income differentials, increases in recurrent educational expenditure which would occur as a result of expansion of the system before salary increases were taken into account, comparative income levels of Kenyan teachers with those in other African countries, and the mounting proportion of national income already scheduled for education in the succeeding five years. By marshalling the relevant data he showed that an enormously explosive educational expenditure potential was inherent in the sector.

As the decade of the 60's drew to a close, the Foundation's support for public administration specialists diminished rapidly. The main task of the Africanization of the public service and the establishment of procedures and institutions for its maintenance had essentially been accomplished. No great satisfaction was felt in the level of performance of the public service but the machinery was in place for the Kenyans to make use of as they wished.

Donald Kingsley and John Thurston returned to East Africa in early 1971 to review the public administration programs which they had sired with their visit ten years earlier in Tanzania.

Only Thurston was able to visit Kenya and his visit was not well timed because the Ndwega Commission had been appointed but had not yet issued its report. Thurston's general impression was that the relatively easy task of Africanizing the public service had largely been accomplished but that the far harder task of improving performance had hardly begun. Although he recognized that changing the direction of Government with a civil service notable for its youth and inexperience was a formidable task, he felt a lack of determination and dedication to improving the civil service at the political level. Tribalism appeared to him to be a particularly strong and destructive force in Kenya. As a result of rapid Africanization, and the placement of relatively young people in senior positions, a block in promotions for those who joined the service only slightly later was already in evidence. The main impact of Thurston's report, which was not shared with the Kenya Government, was to strengthen the belief already held by the Foundation staff that it was time to seek means of improving managerial effectiveness in the civil service and the public corporations, not only in Kenya but throughout the region.

Economic Planning in Tanzania. Apart from the manpower planning already described, the Foundation did not supply economic planning advice to Tanzania until midway through the first five-year plan period, a full five years after independence. As in Kenya, an initial rudimentary plan was issued at the time of independence, and this was followed by a more professional plan in 1964, prepared with assistance from other donors. Shortly after issuance of the document, most of the advisors were withdrawn. Planning was not at that time seen to be a continuous exercise. When Tom Easterbrook arrived in June, 1966, for a 14-month assignment, he found Dev Plan to be "a skeleton with many of the bones missing."

The Ministry never did develop the power and influence which its counterpart achieved in Kenya. It was at a disadvantage in dealing with long-established ministries, strongly staffed with experienced expatriates. There were frequent, often unexpected, shifts in government policy, many of which had widespread ramifications throughout the country. Key ministry personnel were also shifted frequently and without notice. When transfers did take place they were generally effected immediately with no transition or overlap. One advisor was responsible to

Easterbrook found himself fighting fires from a base of shifting sand; only a mixed metaphor seems appropriate to describe the experience. He was daily faced with requests for advice on every aspect of development planning save manpower, which was the only division of the Ministry adequately staffed. The situation improved in 1967 as more economists arrived as part of the build-up for the next planning cycle.

Significantly, Easterbrook listed as the main weaknesses in the process the absence of a regional planning capability, the chaotic state of parastatals, the lack of planning units in other ministries and the need for a wages and incomes policy.

By the time of Easterbrook's departure, Dev Plan had built up to a total of 16 or 17 competent economists of whom two were supplied by the Foundation. It was Tanzanian policy to diversify their sources of development assistance in order not to become dependent on any single country or agency. At one point in the preparation of the 1969/74 Plan, advisors from 13 countries were working in Dev Plan.

Planning units in other ministries were also beginning to take shape. The Foundation supplied advisors to the Ministries of Agriculture, Lands, Settlement, and Water Development; and the Treasury. The price of this independence from single-donor influence must have been a rather confusing mix of policy-oriented advice; there is some evidence that the Tanzanians had difficulty in shaping the melange into a coherent planning process. A Danish advisor supplied by the Foundation complained that the Ministry suffered from a lack of internal leadership, organization and discipline. Nevertheless, Brian Van Arkadie, a Foundation advisor who served as planning coordinator, felt that the process led to a number of crucial decisions and administrative reorganizations.

Van Arkadie, who had previously served as Chief Planning Advisor in Uganda, and Reg Green, an American with extraordinary knowledge of African planning efforts, were recruited by the Foundation at the specific request of the Tanzanian government. Both were unusually influential but Green, who was attached to the Treasury from December 1966 until 1973, probably played as large a role as any foreign advisor in Tanzania since independence.

Green's advice was sought on a number of internal and external economic issues. Initially he focused on matters of East African economic integration but after the Arusha Declaration he became deeply involved in negotiations with nationalized companies and with the planning, strategy and performance of public corporations which were set up to play a dominant role in the economy. He was also concerned with tax reform planning, international monetary policy, and he came to have general responsibility for overseeing economic planning. Dev Plar from its creation until it was merged with the Ministry of Finance in 1976, never really achieved autonomy from Treasury control.

In 1967 President Nyerere issued a series of policy declarations which led to a radical change in Tanzania's development strategy. The first and most important of these was the now-famous Arusha Declaration in which he announced the government's intention to nationalize banks, life insurance companies, and selected milling companies and import/export firms. He also announced policies intended to prevent the emergence of a local elite or privileged class. These were particularly directed against large farmers, small businessmen, intellectuals, managers in the parastatals and the private sector, senior civil servants and political leaders. The President was determined to prevent the growth of a dual-economy, so common in Africa, to establish firm Tanzanian control over the economy, and to create a self-reliant, egalitarian society. It is significant that these policies were articulated by the President and approved by TANU leadership without consultation with the government ministries which were then made responsible for their implementation. The impact of these policies was generally felt throughout the society, but one particular side effect was to reinforce the role of the Treasury and its responsibility for economic management at the expense of the potential growth in importance of planning.

The 1970 review of development planning in Tanzania conducted by Ben Lewis and Gerald Helleiner, an economist from the University of Toronto who had recently spent two years at the University College, Dar es Salaam, drew a basically optimistic picture of the planning process despite recognition of a number of serious deficiencies. Lewis & Helleiner noted that the first plan had been largely a facade because there was little understanding of planning, and the operating

ministries lacked the expertise and inclination to regard the process seriously. They mentioned both an inability to prepare projects properly and the frequent failure to conduct economic evaluations, but they found comfort in the increasing number of economists supplied to Government by foreign aid from 1967 onward.

They found the second five-year plan to be a great improvement over the first because it emphasized the constant need for evaluation and it regarded planning as a continuous process rather than a spasmodic effort to be undertaken each five years. At the highest level of government, Tanzanians were actively involved in drafting the second plan and the degree of commitment to the process seemed to be growing. As in Kenya, an Economic Committee of the Cabinet had been created, with staff work assigned to Dev Plan, and an economic service was established to provide a career path for Tanzanian economists.

The most serious deficiency identified by the consultants was the shortage of suitabl_ qualified Tanzanian manpower for managerial posts in the burgeoning parastatal sector and economic posts in government. In 1969 they found 37 citizens employed in the economic service, out of a total of 98 posts, but their training was generally inadequate. The second plan called for a complement of a 163 economists by 1973, of whom it was hoped that 96 would be citizens. Even if this target were achieved there would remain 67 positions to be filled by expatriates.

Not surprisingly, Lewis and Helleiner placed most emphasis in their recommendations on training and staff development. A diploma program specifically oriented to Tanzania's needs had already been supported at the University of Toronto by the Foundation, but few qualified Tanzanians could be spared to take advantage of it. The team recommended increased attention to the quality of training offered at The University College Dar es Salaam. There, too, a B. Phil. Program had been initiated, without Foundation support, but its courses were not endorsed by Dev Plan and its quality was suspect. The consultants also found fault with government efforts to develop indigenous economic capacity. No one seemed to be responsible for the deployment and development of economic service staff. Despite the shortage of economic

competence in government, the team detected resentment of the expatriate domination of Dev Plan, but did not find it directed at the Foundation because of the small percentage of staff it supplied.

As in Kenya, the report described the Foundation's objectives as "to assist substantially in the establishment of a lasting, effective planning process, indigenously staffed, widely spread and used throughout government". It did not find this objective to be fully shared by the Tanzanian government, but the team thought the President, in particular, favored the spread of the planning process and that the Government in general was moving in that direction. They concluded that the Foundation should be prepared to continue work in the planning field in Tanzania through the decade of the 70's and should place strong emphasis on the development of Tanzanian staff, but only if the Government shared the Foundation's sense of the overriding importance of such a program.

In response to these recommendations, the Foundation agreed with the University College, Dar es Salaam and the Tanzanian Government to provide fellowship support for up to 15 government candidates per year for an MA course in economics at the University. Unlike the B. Phil. Program in Kenya, the Foundation would supply no staff for the program nor would the courses be geared essentially for Dev Plan. The Tanzania Program was open to any Government agency or parastatal requiring staff trained in economics.

The Foundation continued to supply key advisors to the Principal Secretaries of Treasury and Dev Plan, both specifically identified as being critically important, until 1973 when Green transferred to the Swedish International Development Agency (SIDA) and Bevan Waide returned to the World Bank. The last advisor posted to Dev Plan was Tim Aldington who worked on agricultural sector planning in 1974 and 75; this last assignment involved mounting frustrations. The power of Dev Plan continued to decline until at the end of 1975 the Ministry was incorporated into the Treasury Even before that, Treasury held the real power and Dev Plan could only respond to proposals made by implementing agencies. A far-reaching decentralization of government was begun in 1972 which

transferred staff and power to regional centers. This was another radical break in tradition which had and is continuing to have far-reaching consequences for Tanzania, but the impact on planning was to reduce its effectiveness to an even lower level. Planning on the basis of projecting past experience became less and less valid as the Ujamaa Villagization Program swept the country, a process which accelerated greatly in 1974 and '75. Aldington felt that in the course of his assignment he was able to bring somewhat more attention to investment output criteria than was earlier the case, but generally, he did not feel he could recommend that he be replaced by another expatriate advisor. In general he thought expatriates were becoming increasingly ineffective in policy-oriented work in Tanzania.

In all, the Foundation provided eight long-term advisors for a period of 22 man years. Only two of the eight were Americans.

Economic Planning in the East African Community. In 1967 the three East African governments signed a treaty for East African cooperation which was designed to restructure and broaden the benefits from the old East African Common Services Organization (EACSO). The new arrangement, to be called the East African Community, led to a dispersion of headquarters facilities for the common services throughout East Africa, for the siting of the headquarters of the Community in Arusha, and the establishment of two new institutions, an East African Development Bank and a transfer tax to equalize benefits from unequal industrial investment among the partner states.

Since independence, despite the vital importance of regional cooperation concerning the common services of airways, post and telecommunications, railways and harbors, income tax, customs and excise services, civil aviation and meteorological services, and various scientific research activities, EACSO had gradually lost ground to nationalist aspirations for separate development. The Foundation had intended to support EACSO planning and analysis if appropriate opportunities arose but, until the new treaty was signed, none did. The international donor community, among them the Foundation, with its customary concern for efficiency in the use of

resources, responded very favorably to the new agreement which promised renewed regional efforts.

In 1969 the Foundation supplied two advisors to the new development bank located in Kampala and one advisor to organize economic research at Community headquarters. It recognized from the beginning that the Community would be a difficult client because of the cumbersome machinery of its operations, the unsuitability of Arusha as a functional headquarters, at least in the short run, and the lack of centralized direction in its administration. Nevertheless, the stakes were considered sufficiently great for the Foundation to supply 15 man-years of advisors to its institutions. In addition, Chief Oputa Udoji was assigned to the East African Staff College for five years in a role somewhat more closely associated with the public administration program than with the development of the Community institutions.

Relations among the three partner states were harmonious for the first two years under the new treaty, and there was considerable optimism that regional cooperation would be [illegible] because of the greater equity of the new arrangements. At the end of 1970, however, the Amin coup in Uganda caused a severe strain in political relationships in the region. The common services continued to function, but genuine cooperation went into a downward spiral which to this day is continuing. In 1973, the income tax service was split up and at the present time there is serious doubt that the East African Airways can continue in multinational form. A new review commission is currently studying community relationships, but the last Foundation advisor has departed and the program is effectively at an end.

As mentioned above, Chief Udoji's assignment was of a somewhat different character. Since 1962, groups of senior African civil servants have met annually to discuss common administrative problems in their new nations. This series of seminars was initially arranged by David Anderson but it developed into a self-sustaining professional group which finally organized itself into the African Association of Public Administration Managers (AAPAM). Their meetings have served a valuable function, a forum for intimate and reflective discussion of the problem of professionalizing the national public services of Africa. Chief Udoji, who was host to the first

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meeting in Nigeria, became secretary to the AAPAM and was based at the East African Staff College.

The current disarray of the East African Community reduces the value of a solemn assessment of the outcome of the Foundation's work in it, but one generalization can be made about support for international arrangements. The discount rate on the value of program achievements in international circumstances is very high; and the short-run outcomes must therefore be weighed more heavily than anticipated long-run benefits. This is so because:

a. International institutions are more likely than national institutions to break up and disappear;

b. Locally recruited staff are likely to be of lower quality than in national institutions, because the best are kept for national service;

c. On international matters, there is less sensitivity to bilateral aid, hence the Foundation's comparative advantage is less than in the national context; and

d. There are fewer opportunities to advance our understanding of the development process because the nature of the work is likely to be concerned solely with the "modern sectors" of the cooperating countries.

Public Management Program. On various occasions while the major public administration and economic planning programs were in full operation, the Foundation supported associated activities which contributed to similar objectives but were quite distinct in outline and limited in duration. Examples include the sensitivity training courses offered by Nylen, Stout and company, the African Small Businessmens' Study by Marris and Somerset, and the Kericho Conference on Rural Development, which will be referred to elsewhere.

One offshoot which turned out to have a longer lifespan was an interest in the organization and management of public corporations, called in East Africa parastatals. Easterbrook in Tanzania,

it will be recalled, described parastatal management as chaotic in 1966, a view evidently shared by the government which requested assistance. In 1967, Ben Lewis and Professor Les Chandler examined the organization of the parastatal sector and made recommendations for improvements. Their visit was followed by the appointment in 1969 of Justice Langrebe to the National Development Corporation as advisor on Executive Development. The NDC was then a state holding company, controlling 38 companies of which only four had Tanzanian directors.

As the Africanization program in both Kenya and Tanzania largely succeeded in accomplishing its objectives, and the staff development functions became institutionalized, the East African office began to look for ways in which to contribute to improving the performance of the public service, parastatal and private management. A wide range of possibilities was considered including university management courses, the creation of a regional management training institution, arrangements for providing expatriate managers and management consultants, small business training and training abroad for African managers and management trainers. A conference in 1971 sought the opinions of senior African officials on desirable program outlines, and Kingsley and Thurston were invited to return to assess the administrative programs they had spawned and recommend new directions.

In general Kingsley and Thurston felt it was time for the Foundation to withdraw from staff development and manpower planning, the job having been satisfactorily completed. Their recommendations for the future were not the same for all countries, however. Only Thurston was able to visit Kenya and he concluded that if, and only if, the Kenya Government was determined to improve civil service performance, the Foundation should render further support by helping to build up a special management improvement unit at a high level of government. In Tanzania, they assigned highest priority to the development of a corps of African managers, 1,260 of whom they estimated would be needed by 1973. They saw the problem as having many parallels with the Africanization of government in the early 60's and recommended the appointment of a staff development advisor for parastatals.

Dwight Brothers joined the Nairobi staff as Program Advisor on Economic Development and Management in 1970. At Harvard, Brothers held a joint appointment at the Business School

and the Development Advisory Service so he was well equipped to deal with the economic planning program and to shape new efforts in the management field. Aided by the Kingsley/Thurston Report and the economic planning reviews of 1971, Brothers labored to devise an integrated public management program which would combine the remainder of the two earlier efforts and eventually lead to a new synthesis.

He recommended the outlines of a new program to a Foundation staff meeting held in Dar es Salaam in 1973. The features of the program were to concentrate on the public sector, to work with selected African institutions on providing mid-career or in-service management training, to help develop African management trainers, and to work primarily in national rather than regional contexts.

Budgetary considerations imposed severe limits on program alternatives. The creation of a regional institute was not feasible because of different national development strategies in addition to its cost implications. Actually, one staff member was assigned for a time to the East African Institute of Management but the strength of commitment to the community of its members was thought insufficient to warrant greater investment. Small business development was also rejected as a major theme because African leaders did not seem to consider this to be a high-priority area, and the Foundation might be thought to be promoting capitalism against the national commitment to socialism in some countries. Undergraduate management training was rejected because programs of this sort were not generally successful in other parts of the world and were not readily adaptable to the British-style university structure common to the region.

The meeting ended without achieving full agreement possibly because the problem was so much larger than the resources available to deal with it. Since then, although projects have sporadically been supported in this field, interest and activity in management seem generally to have waned.

Langrebe, at the end of his tour, as recommended by Kingsley and Thurston, had been replaced by a parastatal staff development advisor who organized a training program for young Tanzanian executives. In Kenya, the remaining public administration advisors concentrated on

supporting the work of governmental commissions concerned with improving management in the public sector. In Zambia the Foundation aided an attempt to set up a parastatal management development unit. A management training course in Uganda was headed by a Foundation specialist assigned jointly to Makerere University and the Institute of Public Administration.

With the support of a team from the Harvard Business School, an eight-week training seminar for African management trainers was held in conjunction with the East African Staff College in 1972. This was meant to be a continuing series for the purpose of improving the quality of training institutions across the continent, but the West Africa office of the Foundation, which was expected to support the second of the series, declined. An international conference on management education for Africa held in November 1976 at the East African Community Management Institute in Arusha could be considered a sequel to the earlier meeting, but although partially supported by the Foundation, it had no organic links to the previous effort.

In July 1974, a new public management DAP (749-0828) was approved which assumed the terminal obligations of the previous two programs and formally incorporated them under the new rubric . The bulk of the funds, however, went for salary and termination costs of project specialists still serving the earlier programs. Training programs for economists, the B. Phil. program in Nairobi, and the MA program in Dar es Salaam continued to be financed for several years, and in special cases short-term consultants were available to those organizations where resident advisors previously served. The DAP document noted a redirection of attention to the development of managerial competenc in the public sector, primarily through support for improved management training and research, but was somewhat vague about the specific new activities which would be initiated.

This DAP is still active. It was renewed for three years in September, 1976 and it is not the subject of this review; but as an outgrowth of the programs which are of direct concern, some comment will need to be made about it.

Economic Planning and Public Administration Projects in Other Countries of the Region

A full review of our work in these fields in Eastern Africa would require more attention to the countries which are rather summarily dealt with in this section. But the strength and weaknesses of our efforts are adequately illustrated in the Kenya and Tanzanian cases so we may pass rather lightly over this ground recognizing that full justice has not been done either to the governments themselves or the project specialists who served them.

Economic advisory assistance spread somewhat less widely through the region than did our efforts in manpower planning, public administration and management. This is probably due to the size of the critical mass of advisors required to make a planning project viable. In Zambia and Uganda, the Foundation was prepared to provide more economic advisors in the mid-60s than those governments were prepared to request.

Actually, the first firm request for a team of economic advisors received from any country in East Africa was made by Uganda in 1960. At that time the Foundation had no field office in the region and declined to meet the request because of the difficulty of managing the provision of housing, transportation, and supporting services from a distance. In retrospect, this decision seems most unfortunate because the Foundation never again saw a clear opportunity to establish the sort of intimate supporting relationship which evolved in the other two East African countries. Sporadic negotiations occurred from time-to-time which could have led to the provision of a staff development advisor or a group of economists, but for one reason or another no substantial results ensued. The Uganda government came to believe that the Foundation was not seriously interested in its problems and the Foundation management staff experienced some frustration in seeking ways to demonstrate that this was not the case. One suspects that over time, the close relationships the Foundation had established with Tanzania and Kenya, and the role played by its advisors to each of those governments in East African economic negotiations, in time decreased the interest of the Ugandans in Foundation advisory support.

Experience in other countries would lead one to conclude that the likelihood of the Foundations's making an important contribution depended to a large extent on the early provision of

one or two unusually competent men in key positions. Anderson and Thomas in Tanzania, Edwards and Anderson in Kenya, and later Simmance in Zambia and Glynn in Botswana symbolized the kind of competence the Foundation could offer, increase the probability that the government would turn to the Foundation first in seeking help on important matters, and made it possible through their intimate understanding of the local situation for the Foundation to respond sensitively and appropriately to requests. It was not necessary for them to represent the Foundation or seek to promote its interests for them to play this role, and I discovered no evidence that any conflict of interest ever arose. Indeed, the professional loyalty of these advisors was to the government they served and they were frequently urging the Foundation, on their government's behalf, to devote a greater share of the East African budget to that country.

In Zambia, the Foundation sought to replicate the by-then successful Africanization and administrative improvement programs of Tanzania and Kenya. In June 1965 Frank Glynn, then SDA in Tanzania and W. L. Lloyd submitted a consulting report to the Government of Zambia recommending the creation of a management services agency covering staff inspection, manpower utilization and training development. The agency was to be placed under the direction of a staff development advisor. In response to the government's request, the Foundation recruited Alan Simmance, then principal of KIA, to serve as SDA. When he arrived, however, he found that the Establishments Division had rejected the Glynn report recommendation concerning a management services agency and had itself set up a staff inspection and manpower utilization unit manned by four officers seconded from the UK Civil Service. Simmance thus found himself attached to the Permanent Secretary to the Cabinet and to the Minister of State in the President's office who was responsible for the Civil Service, but not in direct contact with those functions of the Establishments Division which had been employed so usefully by staff development advisors in Kenya and Tanzania. In the course of time, a management development unit was in fact set up, with Simmance at its head, but this was five years after his arrival in Zambia.

In the meantime he had found many ways to keep usefully occupied. He concentrated first on the expansion and improvement of administrative training programs in conjunction with the Zambianization

of government. But his activities spread and included during his assignment the following: he served as advisor to a committee on civil service training and attended cabinet level manpower committee meetings, he helped devise schemes of service for career development in the public service, chaired a committee on emoluments and conditions of service of statutory boards, corporations and state-owned enterprises and was a member of committees on the Africanization of the private sector, Africanization of the mining industry, technical education, university salaries, decentralization of administration, computer utilization and foreign service regulations.

I'm unable to assess the outcome of our program in Zambia, but it is evident that Simmance played a key role in the Government's effort to Zambianize its service and provide training opportunities for its staff.

Toward the end of his assignment, and perhaps somewhat earlier, Simmance sensed that the Foundation was wearying of its role in staff development and manpower planning and eager to turn instead to the questions of public management, particularly of parastatal organizations. He disagreed with the notion that the sort of advisory services the Foundation had offered for the past decade in Eastern Africa were no longer needed, particularly in Zambia, and argued his point forcefully in the program discussions on public management. Kingsley and Thurston, who visited Zambia only two days on their 1971 retrospective visit, did not add to his case. Their 2-1/2 page report on Zambia was gloomy and negative about the prospects of improving the public service.

Consequently, despite very high-level requests for him to continue as staff development advisor, Simmance was induced to shift his attentions in 1972 to management improvement for parastatal organizations.

When Simmance left Zambia in 1974, he was the last project specialist to depart the country. Between his arrival and departure, however, eight additional Foundation advisors had served a total of 17 years in such fields as manpower planning, manpower utilization, legal affairs, technical and vocational training, rural development planning, education planning, university planning and parastatal management. Their assignments were not under his direction, but for the most part they were negotiated through his offices.

Manpower planning did not enjoy great success in Zambia, indeed nowhere did it achieve the importance it had in Tanzania. Yet it was a service provided more widely than any other by the Foundation to the countries of the region. In Uganda, a young economist selected by the Ugandans was engaged by the Foundation for manpower planning. It was intended that he would work under Bob Thomas' close supervision, but in practice he failed to call for assistance and Thomas was reluctant to intervene uninvited. In the Sudan, an initial manpower survey was conducted with Foundation assistance, but a military coups led to the termination of the effort. Generally, it seems that manpower planning was perceived to be within the competence of a single advisor, but in practice it could not succeed in becoming an important instrument for shaping resource allocations unless it operated in a highly congenial environment. This could only be created when the process was understood and given hig priority by the top levels of government and when manpower planning received support from other officials and departments.

In 1970 the Foundation launched a planning and administrative advisory program in Botswana modeled closely on East African experience, which is fluorishing to this day. Frank Glynn moved from Tanzania to become a staff development advisor in February 1970. Advisory services have since been provided to the Ministries of Agriculture, Education, Mineral Resources and the Attorney General's Chambers. This year a senior economic advisor has been assigned to the Ministry of Finance and Development Planning. Many of the staff who have participated in that program had earlier served with the Foundation in East Africa. Although it is too early to evaluate the Botswana program, it appears that the East African model has been modified and transferred very successfully.

Program Options

The true opportunity costs of a large program investment should be considered in the context of the full range of alternative uses of the funds, but that would open the subject too wide to be encompassed in a paper of manageable size. Instead, we focus on a few things we could have done differently in pursuit of the objective of assisting new African governments to gain meaningful control of their public services and economies. Within these boundaries, one can consider such questions as whether we should have devoted more attention to research and training in East African universities, whether we should have provided PhD training for some government economists, whether a backstopping organization such as the Harvard DAS should have been employed to manage the economic planning program, and whether we should, recently, have accepted a Kenya Government request to manage a large-scale agricultural planning project funded by other donors.

University Focus. The Foundation could have opted for the strategy of building departments of economics and/or development research programs in East African universities, at the cost of supplying five or six fewer advisors each year. I see little merit in this alternative for the following reasons:

a. It would not have conformed to the priorities of any of the governments we assisted. Although they were interested in university development, their needs for advisory assistance were considered to to be much more urgent in the years shortly after independence.

b. The Rockefeller Foundation focused much of its efforts in East Africa on developing research competence in the universities. My impression is that their work was adequately financed and ably led by scholars like Philip Bell and James Coleman. There does not seem to have been a shortage of either research funds or scholars in the region. Tony Killick assembled a bibliography of over a 1,000 listings on development in East Africa. In his opinion, at the present time no good research proposals lack funding.

c. The gulf between academia and government, so typical of developing countries, is especially deep in Uganda and Kenya. There was for example strong resistance to the B. Phil. Program when it was first established because of academic disdain for "applied" economics. The Rockefeller Foundation has I believe encountered some difficulty with its own research programs because of its preference for

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research on the urgent problems confronting government. In Tanzania, although the university is now apparently working closely with government, my impression is that the atmosphere is so politically charged that the only acceptable input from the Foundation would be money.

Tony Killick, whose base is the University of Nairobi, gave his opinion that the Foundation's economic advisors have made a greater contribution in Kenya than could have been accomplished with the expenditure of equivalent funds in the university context.

PhD Training. On this subject I am somewhat more ambivalent. In Kenya, it is doubtful that more would have been accomplished if we had diverted funds from advisors to scholarships. The most able Kenyan economists, such as Ndegwa and Mule, could hardly have been more effective if they were better credentialed. Also, the cost of their training would have been high in terms of time off the job. Kenya does need well-qualified analysts in government, however, and the need will probably increase in the future. Despite the fact that prevailing terms of service offer no inducement for an individual to carry on to the PhD level, and then enter the economic service, Kenya will need to find some way to attract one or two good local economists before long. Harris Mule recognizes the need to offer greater inducements and the Foundation should consider providing one or two scholarships per year for advance level training if Mule succeeds in changing the terms. Ideally, the training should be provided at a university which has continuing links with East Africa through consulting or research programs.

In Tanzania, the need for highly trained local economists is probably greater than in Kenya, but the prospect for producing them is undoubtedly less. The decline of planning as a governmental function in Tanzania adds greatly to the difficulty of making sound economic decisions, and the precarious state of the Tanzanian economy accentuates the need for good decisions. Nevertheless, I was told that it is unlikely at the present time that a Tanzanian student would be permitted to take a PhD in economics at a western university. Even if ideology were not a problem, it would be difficult to find suitably prepared candidates for doctoral training. Ten years ago, or perhaps even five, we would have done well to have searched intensively for good candidates, and then to have sponsored them, but it was difficult to see at that time that the economic structure of government was going to suffer the vicissitudes that it did.

The DAS Team Approach. The Kenya planning program was unusual in the Foundation's experience because the Development Advisory Service or some other university-based group was not invited to recruit advisors and manage the project. In retrospect, few who are familiar with the project would argue that it should have been otherwise. Costs per man year were lower, but a more important factor may be the image problem that arises when a backstopping institution enters the arena. The fact that the Foundation's advisors did not consider themselves to be a team was remarked upon several times during my recent visit to Nairobi. It is clear that the team approach would now be unacceptable, although in 1963 the Kenya Government might not have objected.

One advantage usually cited for using a backstopper is the greater recruiting resources at their command. Recruitment was often a problem for the Foundation, but Ben Lewis and Ed Edwards shouldered much of the burden and my impression is that we were successful in fielding as well qualified people as any others in the business. Certainly, Harris Mule contends that the quality of Foundation-supplied advisors has exceeded all others in his experience. The Foundation's office did not provide professional backstopping to the advisors, indeed we generally didn't even know what subjects were uppermost in their minds, but I doubt that time or inclination would have led them to call on research or information services from a university abroad.

One drawback that was felt on occasion was the insecurity of a Foundation appointment. DAS advisors are sometimes tenured and have less worries as their contract dates roll around. I don't believe this affected the quality of the program but it may have affected the morale of the advisors. I know of no case where this was a serious problem.

Technical Assistance Pool for Agricultural Planning in Kenya. In 1975 the Foundation was approached by the Kenya Government about its willingness to undertake the management of a pool of economic and management advisors to be assigned to the Ministry of Agriculture. The Government wished to strengthen the Ministry's capacity by consolidating the administration of 12 to 13 advisors under one agency. Eight other donors were being asked to finance the advisors through cash contributions to the Kenya Government which would in turn pass on the funds to the administering agency.

The scheme was not meant to create a planning team under centralized direction. On the

contrary, the government wished to duplicate the style of advisory assistance the Foundation had provided to the Ministry of Economic Planning and Development. There was to be no team leader or team concept involved, but by having a single agency manage the project and recruit the advisors, it was thought that the technical assistance effort would be assured of continuity, quality, and equity in terms of service offered.

The objectives of the project were to assist in defining and refining the objectives of agricultural development, the formulation of a comprehensive development strategy for agriculture, policy analyses concerning cost, prices, production and marketing of commodities, and international liaison. A section of the Ministry was also to be devoted to evaluating the effectiveness of the conduct of the ministry's normal activities such as agricultural extension, research, etc.

The Foundation, after extensive consideration, declined the request and the Harvard Institute of International Development (HIID) then agreed to undertake the project. At the time of my visit in December 1976, four advisors were at work in the Ministry. More are being recruited, but I don't believe it is now intended that the project will reach the size originally anticipated.

Although there were questions about the legality of the Foundation's receiving funds from a government for the provision of advisors, it seems to me we should have found some way to respond positively to this request, for the following reasons:

a. The Kenya Government asked us to do so, it was within our means, it was a sensible suggestion and the activity was well within the bounds of our program concerns;

b. Association with this project would be highly complementary with our future work on rural development and agricultural research;

c. By undertaking the project we would remain a visible and significant assistance agency despite our reduced budget; and

d. The experienced staff of our Nairobi office would have greatly eased the logistical problems of the advisors.

HIID has recruited a very able group so far, but they still must devote too much of their time worrying about housing, automobiles and project negotiations, all of which are normally not the concern

of project specialists. Often it is useful for a project specialist to have matters concerning his working environment raised by the representative with the appropriate person in government rather than having to do so himself. For HIID to manage a project like this from Harvard is, I should think, much more cumbersome and expensive.

Probably the strongest of the above points is that relating to the Foundation's maintaining a continuing meaningful contact with the government. As our budget is devoted more to grants and less to project specialists, the office may be in danger of losing currency in its contacts with government and thus becoming involved in fewer activities of central importance.

Program Management and Logistics

The value of having field offices is demonstrated by the programs under review. The Foundation was probably right to decline the Uganda request for advisory assistance in 1960, despite the loss of an opportunity which did not again arise, because of the managerial and logistical problems involved in trying to design and manage an advisory program from a distance. Housing, transport, work permits, customs arrangements and a myriad of details involved in settling into a new city could keep advisors preoccupied for weeks or months if no experienced local staff were available to assist them.

More importantly, the Foundation's field management staff are responsible for negotiating the nature of an assignment, assessing the suitability of candidates before they are recruited, and serving as intermediary with the government concerned if the professional character of the assignment does not turn out to be that which the advisor anticipated, or the advisor does not turn out to be capable of performing at the level the government requires. The program management role thus demands regular contact with both the advisors and government officials, but care must be taken not to become engaged in the content of the advisor's or the government's work. It is necessary to be knowledgeable enough to judge the feasibility of requests and proposals without crossing the line into matters government considers to be confidential.

The location of the Foundation's office in Nairobi doubtless meant that Kenya was better served by the Foundation than the other countries of the region. Where Staff Development Advisors were posted,

they carried much of the burden of hosting visitors, helping new people settle in, and maintaining contact with various parts of the government. But they were only able to forward requests for staff, grants or travel awards to Nairobi, a process which took time and probably resulted in less assistance being requested and granted than had the chain been shorter.

Alan Simmance estimated that a quarter of his time in Lusaka was devoted to Foundation-related administrative work and believed that some recognition of the fact, such as the title of assistant representative, would have been appropriate. David Anderson and his successors in Dar es Salaam performed similar duties. Anderson was named assistant representative while still attached to the Kenya Government, and later became representative.

The posting of assistant representative/project specialists in countries where no regional office is located was a common practice during my tenure in the Middle East. In my opinion, this worked out very well. It gave the specialist an opportunity to broaden his associations in the country of his assignment and it offered good experience for people who might remain with the Foundation in a management capacity. Other representatives have had less satisfactory experience with this type of arrangement, sometimes arriving in on a visit to find themselves committed to entertain a grant or project in a field they preferred to avoid. There is also the question of professional accountability. It would often be inappropriate, I think, for a man serving in such a sensitive post as Staff Development Advisor or senior economic advisor to bear a title like assistant representative. It was important that their professional responsibilities were seen to be, as in fact they were, to the governments they served.

The recruitment of mature, well-qualified advisors was perhaps the most difficult aspect of managing these programs. It often took an awkward amount of time to find the right person, but the policy of waiting until a good candidate could be found before filling a post was surely correct. The Foundation's professional grapevine, in economics and administration, and its reputation as an employer, made the performance creditable despite the delays and frustrations often experienced by field staff.

Program Outcomes

The long-range outcomes of these programs will depend on future events and need to be considered in the broader context of the national strategies being pursued by Kenya and Tanzania. This section of the paper deals with the way the programs are currently perceived by people in East Africa and outside who have been familiar with their progress. Only the economic planning, administrative and management programs in Kenya and Tanzania are considered henceforth.

Economic Planning in Kenya - Discussion of four sets of benefits or objectives:

- plan formulation;
- economic analysis and policy advice;
- training;
- establishment of a planning system throughout government.

1. Plan formulation

Four economic plans, including the preliminary document issued just after Independence, have come out in Kenya, with Foundation assistance. The plans themselves may have been less important than the process of discussion and negotiation that went into their production. In the early years in particular, the preparation of the plan was a highly instructive process, not only for the Ministries, but for the Cabinet as well.

Plans serve several functions: they are a means of communicating to the people economic accomplishments and intentions; they fulfill the requirements of donors like the World Bank who wish to see projects in a larger economic perspective; and they serve as a guide for government action for the succeeding five years. The second of these purposes was uppermost in mind when the Government first requested assistance, as we have noted, but under Mr. Mboya's leadership, planning came to have real influence in shaping government policy.

More recently, doubts have arisen about the seriousness of Government intentions to use the current Plan as a guide to action. One of the principal drafters of this Plan felt that the document had become more of a political than an economic instrument. He doubted that Government seriously meant to pursue the rural development and income redistribution objectives stated in the Plan, and he felt that balance of payments and growth estimates had been adjusted for credibility and political acceptability.

It is quite possible that the Plan does not fully reflect political realities in Kenya. Indeed, it would be surprising if it did, because the major drafting of this and all previous plans was from the hands of foreign advisors. The drafting was, of course, under Kenyan supervision, and both Cabinet and Parliament reviewed and approved the final version, but some departure from reality is inherent to the process.

Another factor which lessens the likelihood that the document as approved will be followed faithfully is the enormous influence of the outside world on an economy the size of Kenya's. This was dramatically demonstrated by the drastic rise in oil prices, and the subsequent world recession, which occurred immediately after the Plan was drafted, throwing its forecasts seriously out of kilter.

With all its limitations, planning has probably worked better in Kenya than in most African countries, according to Tony Killick who observes the process closely from his position as head of

the B. Phil. program at the University. Killick has limited faith in the planning process itself, however, and has oriented his program more to policy decisions than to plan drafting.

2. Economic analysis and policy advice.

Immediately after independence, there was a good deal of uncertainty over what economic course Kenya would choose to follow. The early issuance of a number of important policy statements, e.g., the rudimentary six-year plan issued in early 1964 and Sessional Paper No. 10 in 1965, elucidated the objectives and priorities of the Government. These statements were important to the World Bank and bilateral donors, potential private investors, and the European community still residing in the country, as well as to Kenyans themselves. The economy was able to rebound surprisingly quickly once these uncertainties had been dispelled.

After economic growth was adopted as the principal economic objective of the Government, the advisors in MEPD had an important restraining role to play in addition to their more positive planning functions. They were able to help Kenya resist showy, plaque-hanging projects and inefficient turn-key operations by employing cost-benefit analyses. They were also helpful in curbing the strong tendency to tailor projects to meet donor requirements, to accept aid for imported goods which could be produced domestically, and to finance imports through aid even though higher costs would result. Equally important was the ability to identify and maintain a high priority for essential plan projects which were not especially attractive to donors.

Senior Government officials in various ministries were often rather innocent in evaluating the costs and benefits of major investments. Such projects as a major steel-works and a motor car assembly plant were either avoided, delayed until the economy could absorb them, or reduced in scale as a result of economic analysis. In other cases, the economists lost the argument and the Government made large investments in dubious projects such as the fertilizer plant and sugar refineries. It is quite possible, of course, that the economists were wrong in their judgments of these projects. In general, however, it is safe to assert that the use of economic analysis to avoid bad investments saved millions of pounds.

Another valuable role played by the planning advisors was to identify adverse domestic and foreign economic trends before they resulted in a crisis. There is a natural tendency for policy makers to avoid taking unpalatable economic measures until the situation becomes so bad that it is imperative that something be done - by that time, corrective action is commonly much more painful than it would have been initially. In some cases economic analysis has convinced policy makers to take earlier action. The devaluation of the three East African currencies in October 1975 is one example where this occurred. Although in the six months between when the devaluation was recommended and when the decision was taken, the situation changed so that a somewhat greater devaluation would have been more appropriate, the move was made well in advance of the point of dire necessity.

Kenya's decision in 1965 to adopt a policy of population growth restraint was also the result of economic analysis rather than concensus. In this case, however, the adoption of a policy did little to curb the fertility rate, and population growth continues at around 3.3%.

The Government has devised several ways of informing ministries and private decision-makers of economic trends and potential problems. A comprehensive economic survey is published by the Central Bureau of Statistics each year and a business expectations survey is collected quarterly, but its utilization is spotty. Information for the latter is gathered from firms employing 20 or more people and concerns their estimates of their employment levels, sales, and inventories for the next three quarters as well as their experience from the past quarter. In addition, the Ministry of Finance and Planning puts out a monthly circular which identifies international and domestic problems and opportunities which people should be thinking about. Circulars have been issued on food and famine, balance of payments, employment, and quarterly economic fluctuations, among other topics. These surveys and circulars were not Foundation-financed, but their content was much affected by the work of Foundation-supplied advisors.

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The growth of the Kenya economy in the first decade of independence was most impressive. In real terms the rate of economic growth was estimated to have averaged 6-1/2% from 1964 to 1970 and overall income per capita increased by an estimated 3-1/2% per year. There are, however, aspects of the pattern of growth which have disturbing long-term implications. Development economists around the world are exhibiting a new sensitivity to income distribution patterns, and in Kenya the disparity between rich and poor is in sharp contrast with the egalitarian development of neighboring Tanzania, a distinction which has attracted the analytical attentions of many students of development.

In 1972 an extensive study of the problems of employment and income distribution was made by a team from the International Labor Organization jointly headed by Professors Hans Singer and Richard Jolly of the Institute of Development Studies at Sussex. The 600 page report was sharply critical of many economic policies in Kenya and made a series of recommendations designed to broaden income distribution while maintaining a relatively high rate of economic growth. This report and a book, published in 1974 by Dr. Hollis Chenery and others entitled Redistribution with Growth, have come to symbolize a strategy for development which was incorporated into Kenya's 1974-79 Economic Plan; it is a strategy which can be contrasted with the "Redistribution and Self-Reliance" strategy of Tanzania as well as with the earlier growth-oriented strategy of Kenya itself.

The report's main criticism of the Kenya economy was that the country had inherited, and through its chosen pattern of growth perpetuated, a sharply distinguished dual economy consisting of a small modern sector and a traditional sector consisting of the bulk of the people who remained very poor. The modern sector employs unnecessarily capital-intensive technology offering few jobs, is excessively protected from foreign competition, and costly to consumers because of inefficiency. Those workers fortunate enough to obtain jobs in the modern sector organize to maintain their privileged position, forcing up wages to the international level but opening a gulf between themselves and the unemployed and traditional laborers. The mission generally found a pattern of regulations and policies which tended to favor large scale farmers and to over-protect

local industries which were often owned and sometimes managed by foreign companies and individuals.

Many of the policies of which the ILO Mission was critical were also opposed by the Foundation's economic advisors. Charles Slater, David Davies, and John Powelson, all of whom left Kenya in the early 1970's, expressed great frustration in their attempts to change policies which in their view favored the modern sector and retarded rural development. Their terminal reports, the only such statements requested (but not required) by the Foundation, were quite explicit and were submitted jointly to the Foundation and the MEPD. Powelson's specific complaint was that Kenya's development policy was founded on import substitution and capital intensity. He cited the following policies as the basis on which this strategy was constructed:

" 1. Low interest rates, which encourage capital intensive production rather than employment of labor;

2. Tax incentives for investment, which do the same;

3. Low import duties on capital goods, which do the same;

4. An over-valued exchange rate which encourages imports (including labor saving machinery) and discourages exports (which consists largely of labor intensive goods such as agricultural produce)."

With respect to these policies, it is interesting to note that interest rates were raised in 1973 and 1974, investment incentives were cancelled for Nairobi and Mombasa, import duties on capital goods were raised in 1976, the currency was devalued in October 1975, and an export subsidy was introduced in November 1974. It would not be wise to conclude from all this that the Kenya Government is completely responsive to those who favor broader income distribution and greater concentration of resources on rural development; it will be some time before one can assess the political will and determination of the Government in implementing the "Redistribution with Growth" policy embodied in its Five-Year Plan. But I think one can say that the Foundation's advisors have

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consistently urged attention to the problems featured in the ILO Report and that their efforts have not been without effect. It may also be remarked that advisors, particularly on two-year assignments, tend to be unduly impatient in expecting changes as a result of their recommendations.

3. Training.

During the first five years of the economic planning program very little formal training was possible. The advisors in effect did the planning themselves under the policy guidance of the Minister, the Permanent Secretary and the Chief Planning Officer who were Kenyans. Other staff in the Ministry were seldom equipped to play the role of counterpart. Nor was it possible to secure the release of good prospects for further training from government ministries; the people with adequate potential could not be spared for the necessary length of time.

Paradoxically, two of the senior African officials then engaged in planning now point to training as one of the principal benefits of the initial program effort. The leaders of the newly independent Government generally had little economic training and virtually no experience in development or international finance. The interaction of the first advisors with the people in the Ministry and in the Development Committee of the Cabinet was very important in fostering the growth of economic sensitivity at the highest levels. Sessional Paper No. 10 was important because it provided a framework for the detailed discussion of many policy issues. In addition, policy papers were drafted on a wide range of subjects as the revised plan was being prepared.

The supply of manpower with economics training has greatly increased since the establishment of the Economic Service and the B. Phil. program at the University. Harris Mule, the current Deputy Permanent Secretary for Planning, is particularly pleased with the B. Phil. program, not just for the quality of training provided but because of the attitudes it engenders. The rate of departure from Government of economic service staff has dropped to zero, and this in itself is extraordinary. Mule believes that by 1979 he will have a solid core of 40-50 members of the economic service who have completed not only the B. Phil. program but also an MA at York University.

There are limitations to this training process which should be kept in mind, however. For economists, Government tends to be the employer of last resort because of its relatively low salary structure. In addition, economics is not the first choice of subject for many students at the University: medicine, engineering, and even business studies tend to get better students. At the graduate level, most B. Phil. candidates are roughly on a par with the MA students in economics, according to Killick, but the brightest one or two are in the academic program.

There are no PhD economists in the economic service nor, given the present salary structures, is this likely to change. A person entering Government with a BA in economics and progressing through the available training programs in the usual time will be ahead of any in his age group who go directly through a PhD program.

In Killick's view it is extremely unrealistic to expect to train local people in five or even ten years to replace advisors such as the Foundation has provided. In general, the people who have so far gone through the B. Phil. program could not be expected to attain the quality of the foreign advisors even with extensive further training. This is not meant to be critical of the B. Phil. program or the economic service; for most positions in government a PhD would be superfluous even if the salary level became attractive.

Although gratified by the results of the B. Phil. program, Harris Mule is not satisfied with the training system partly because it does produce only middle-level economists. He has been impressed with the comprehensive training strategy that is employed in Malaysia and hopes to get assistance to work out a similar plan for Kenya.

The experience of advisors in providing on-the-job-training for staff in the Ministry is somewhat mixed. One advisor, who served in the Ministry for eight years, worked in that period with seven counterparts. He notes that two are now bankers in high positions, two are managing directors of important parastatal organizations, one is a senior economist in the Ministry and two others have left Government. Other advisors have had the feeling that the

counterparts have not really had the opportunity to develop because the responsibility for writing papers and drafting the plan has remained with the advisors themselves. In many cases, senior officials of the Ministry want quick action and themselves discourage participation of more junior Kenyans in the interest of getting the job done.

The creation of the economic service was a device to ensure the proper use of scarce skills and to provide a career path for trained economists. It is my impression that the full potential of this device has not been realized. Some members of the service are in posts where their skills are not in great demand and, apart from the formal training programs, little is done to increase the sense of professionalism of its members. More attention might well be paid to finding means of offering professional enrichment and recognition to members of the service Their sense of professional standards can have an important impact on the quality of government.

4. "The establishment of a lasting, effective planning process, indigenously staffed, widely spread and used throughout Government."

This highly ambitious objective, which seems to have been introduced to the documentation of this project as recently as 1970, can only be addressed in a rather speculative way. The term "planning system" is taken to mean the whole range of procedures devised for systematically bringing rational analysis to bear on investment and policy decisions. Whether these procedures have become such an integral part of the functioning of Government in Kenya that they would survive the departure of the last advisor from any source is difficult to say. Even more difficult is to know the extent that surviving procedures would retain their functions, as well as their form.

One can consider the degree of establishment of the planning system in terms of its spread horizontally through ministries of Government and vertically through provincial and district levels. Secondly, one can look at the adequacy of the staff available to man the system; and thirdly, one can observe the degree of political commitment to rely on this type of system as a basis for decision-making. Before viewing the question through these three lenses however it may be useful to note that for several reasons the economic problems of Kenya, and hence the need for economic

advice and planning, are likely to increase in the future. The relatively easy industrial growth for purposes of import substitution is probably over and the problem now will be to force these highly protected infant industries to become more competitive. This means that the rural areas must become the source of a higher proportion of Kenya's economic growth. Agricultural growth will henceforth need to come from more intensive farming rather than from bringing new areas into production, but here again the easier gains have already been made. African farmers were barred from raising coffee and tea until less than a decade before independence. The good performance of the agricultural sector since independence is in part due to their increased participation in growing export crops. Internationally, foreign exchange will become a serious constraint in Kenya and the international economic climate, with inflated prices for fuel and capital goods, is not favorable. Higher coffee prices have taken the pressure off the balance of payments situation for a year or two. Domestically, population pressures on the land and the cities are becoming more acute, while the quality of the administrative services is gradually deteriorating. One could add that this set of adverse factors is likely to affect Kenya less than most countries in Africa, but that is hardly a cheerful perspective.

The spread of functional planning units in the operating ministries is still uneven. Sometimes this results from a lack of qualified staff or technical assistance, but there are cases of high-level resistance to bringing planning into the affairs of ministries. In other cases, an example being the Ministry of Agriculture, a planning unit has been in existence for a very long time with rather disappointing results. As previously noted, the Ministry is currently embarking on an ambitious technical assistance program to remedy this situation. Planning units now exist in addition to agriculture in the Ministries of Cooperative Development, Tourism and Wildlife, Works, Education, Lands and Settlement and possibly Natural Resources. Some of these were originated by Foundation staff; Roeske in Power and Communications, Stabler and Williams in Education, and Davis in Tourism.

The extension of the planning process to provincial and district levels was seriously attempted in 1967, unsuccessfully. Edwards noted in a 1968 paper on planning in Kenya that the lack of good communication with the public, particularly in the rural areas, was a serious flaw in the planning process. He felt that people at the district level should participate in setting their agricultural targets. The attempt to engage district level participation ran counter to the tendency at that time to reduce the powers and responsibilities of local government, local inefficiency and ineffectiveness in providing health services and primary education, and in building feeder roads, housing and water facilities, led to the increasing centralization of responsibilities in the appropriate ministries. In addition to this counter-tendency, the shortage of manpower with even rudimentary training in economics at the district level was acute.

New plans are afoot to spread the planning responsibility to the provinces and districts In addition to the appointment of provincial and district planning officers, the Government is insisting that the service ministries allocate substantially greater proportions of their budgets to rural areas. The service ministries are to work with the provincial and district level planners, the result being a disaggregated plan which remains consistent with national priorities. That at least is the intention. One must remain skeptical of the success of this effort because of its complexity, the continuing shortage of adequately-trained staff, the problem of generating meaningful communications between levels of government and across great distances, and the still doubtful degree of governmental determination.

Much has already been said about the quality and quantity of the economic service. It seems clear that the planning system cannot yet rely exclusively on Kenyan staff, nor will the full range of competences be found locally for some time to come. This does not mean that Kenya is necessarily dependent on external advice, but the departure of all foreign advisors before the end of this decade would in my opinion rapidly alter the role of economic analysis in the decision-making process. Planning procedures and the issuance of quinquennial plans might very well be maintained in form, but perhaps not in content. This view is disputed by Kurt Savosnik, a long-term planning advisor who is still resident in Kenya though outside of government, and Harris Mule. Savosnik believes that if every expatriate economist left Kenya tomorrow, the system would slow down but would survive as a meaningful process in government. Mule similarly believes that planning has been accepted as an integral part of government and would survive with wholly indigenous staff.

In 1969 David Anderson made a statement concerning administrative procedures he had helped to introduce in Tanzania which I think is pertinent to this point: "we ought not to retain staff in this field any longer than is necessary to demonstrate the techniques and to prove the need, but we should

realize that if we withdraw our staff too early either they will have to be replaced by other expatriates or the system will fall into disuse, and there will be a reversion to the old methods of instinct and pressure bargaining."

This tendency may be illustrated by an example which has already occurred in Kenya. The prices of several key agricultural commodities, sugar, rice, wheat, beef, maize and millet, are set by Government in advance of the growing season at farm level, at the wholesale level (handled by parastatal marketing boards), and at the retail level. These prices are set by the Cabinet on the recommendation of the Ministry of Agriculture and the Ministry of Finance and Planning (MFP), (MEPD and the Ministry of Finance were re-combined in 1971). The MFP has generally made an economic analysis and discussed the ensuing recommendations with the Ministry of Agriculture before forwarding them to the President. But recently, the President has begun setting these prices on the basis of consultations undertaken within and outside government. In September of this year, for reasons not stated, the President announced next year's prices before receiving ministerial recommendations. The new prices include an increase at the farm level but no increase at the retail level with the probable result that some of the marketing boards will be operating at a loss. They will, of course, turn to government to recoup their losses once they are incurred.

Government is faced with the choice of waiting to see the extent of losses and then reimbursing the marketing boards, estimating reasonable losses and setting limits before they occur, or requesting the President to raise retail prices so the losses will be unnecessary. The ministries are understandably reluctant to request the President to alter his decision, so the most likely course of action is that nothing will be done until the marketing boards find themselves in crisis. This reversion to "the old methods of instinct and pressure bargaining" occurred while adequate competence for economic analysis was still readily available in Government. The case illustrates,

to me, that political pressures for expedient decisions are likely to rise as the economy enters more difficult phases and, even if the economic service has the competence to produce sound analyses, its views are likely to be overriden in the interest of political expediency. This process may occur under any conditions, but is likely to be at least retarded if forceful and prestigious advisors are available to the ministries.

This is not to argue that economic considerations ought always to outweigh political considerations, but to the extent that political choices are made with full knowledge of their economic cost, one can hope for better decisions.

This leads to the important question which is the political determination of Government to implement its own plans and policy statements, that is, to <u>use</u> the decision making planning system it has established.

The 1974-1979 Plan was probably the first five-year plan in the world to be solidly based on the Redistribution with Growth doctrine. One of the Plan's principal draftsmen expressed serious doubt, as we have noted, that the Government in fact intended to make a determined effort in the direction of redistribution. Up to the present time, doubts must remain concerning the extent of this determination, although the unanticipated rise in oil prices and the subsequent worldwide recession are mitigating factors. Nevertheless, powerful groups in Kenyan society may be expected to resist the redistribution doctrine in their own interests. Within Government, ministries often are reluctant to reallocate a greater share of their efforts to rural areas because of the difficulty of inducing staff to leave the capital. It is simply too early to say whether a meaningful decentralization of planning and decision-making will occur, the rural works program will be successfully implemented, and the Ministry of Agriculture will divert more effort from the large farmers to small holders and from prosperous to less affluent regions. One cannot be assured that even with strong political determination the Government would have the organizational and staff capacity to succeed in signficantly altering the pattern of income distribution, but one can be certain that without that determination, income maldistribution will increase.

A final factor concerning the degree to which a planning system has been established in Kenya will be alluded to here but discussed in more detail in a later section. This has to do with what one might call the ecology of planning. Economic planning and analysis represent a rather artificial and abstract approach to problems. The requisite analytical techniques go beyond the boundaries of intuition and common sense and as such frequently arouse hostility and mistrust among the uninitiated, as anyone who has attended a sociological convention will have observed. For a planning system to be established and used effectively by a government, an environment will need to exist in which this style of abstract thinking is respected. In most of the central ministries, as we have noted, economic analysis has been held in very high regard since the early years of independence, but whether this condition can be maintained over time and spread through provincial and district levels is problematical. It would seem to me that increased efforts to strengthen the professionalism and the sense of professional identity of the members of the economic service would be useful in bolstering their self-confidence and the respect they can command from other elements of the public service

Program Duration

The reduction in support of this program by the Foundation since 1971, and the departure of the last advisor in 1976, was apparently sufficiently gradual to permit the Government to make the necessary adjustments. Advisory assistance is plentifully available from other sources, and, with one major exception, Mule appears satisfied with the Foundation's decision to withdraw. The exception is the post of senior economic advisor which was vacated by Edwards this past year. Mule considers this position to be so important and so sensitive that he and the Minister are unwilling to request assistance from a bilateral donor. The Government has requested the UNDP to fill this post under two conditions: that the candidate be selected from a list submitted by the Kenya Government, and that the advisor selected should not be required to provide the UNDP with quarterly reports on his activities as is commonly the case. The local representative of UNDP agreed to these conditions initially but apparently has not been supported in his decision by UNDP headquarters.

Mulo thus remains interested in securing a high-level advisor from the Foundation who could undertake important economic analyses and could design a long-range economic staff development plan as well.

Economic Planning in Tanzania. Although one must be somewhat tentative in assessing program outcomes in Kenya, he can be even less certain of the results in Tanzania, for a number of reasons: the rapidity of change of policy objectives, the inadequacy of reliable data (especially after the decentralization of 1972), the impact of the economy of external forces such as prices and weather, and the frequent ideological bias one encounters in talking with people about the country.

Tanzania came to independence with a per capita income only half that of Kenya, with but a fraction of the trained manpower and with a much less developed institutional framework. The common market and common services arrangements in the colonial era had generally favored Kenya in the location of industry and the siting of the headquarters of various services. On the other hand, tribalism was less significant as a political force because Tanzanian tribes were smaller and more numerous than Kenyan.

Despite these differences, the problems faced by Tanzania and Kenya in the early 60's had many similarities and until 1967, or even somewhat later, the governments went about dealing with their problems in rather similar ways; each issued a rudimentary economic plan shortly after independence, and then constructed a more professional plan with the aid of economic advisors.

In Tanzania, the 1964 Five-Year Plan, which replaced the initial three-year plan, was a good technical document but in less than a year its projections had been seriously distorted by international economic forces rendering it of little use as a guide to action. Sisal prices fell by 50% and smaller declines affected the prices of cotton and coffee; drought slowed the growth of government revenues while international diplomatic disputes greatly reduced foreign aid. The departure of the advisors shortly after the completion of the plan in 1964 meant that not only was no revision forthcoming, but economic problems were not clearly diagnosed until late 1965 when a

commission headed by a British economist reported to Government.

Another similarity was the appointment of an Economic Committee of the Cabinet. This Committee failed to meet during the time the first five-year plan was being prepared, which partially accounts for the plan's lack of realism, but during the second planning cycle the Committee played an important role.

In the period from 1967 to 1969, while the preparation for the second five-year plan was underway, Dev Plan hit its stride, consulting with other Government ministries through 16 ad hoc working parties, planning an economic service for Tanzanian economists and issuing annual economic surveys, reviewing agricultural prices, etc. Procedures were devised for drafting annual plans and setting up ministerial planning units.

Lewis and Helleiner hit the crest of the wave in 1970. When Ben Lewis returned to Tanzania in 1972, the picture had already changed. Their report had stressed the importance of training, and this view received an apathetic reception. Helleiner had returned as a consultant after their review to draw up a comprehensive training program. But Lewis found that no government students were available to the university program; they were sent instead to the field as "planning officers" without training and with little notion of what they were meant to do. Dev Plan, stripped of local talent, had lost its earlier sense of purpose and drive; the atmosphere seemed to Lewis to be one of indifference and drift.*

One can surmise what happened to stunt the apparently healthy growth of the planning function by reviewing some of the key decisions that were taken outside of the Ministry.

The Arusha Declaration of 1967 in a sense gave planning a boost despite the fact that Nyerere consulted no economists or civil servants before announcing the nationalizations and that the Ministry of Finance received the main burden of negotiating with the companies drawing up financial guidelines for new public corporations. Dev Plan still had the major task of working through the macro-economic implications of this sharp change in policy. It was also instrumental in helping ministries reshape their

* Personal communication from Lewis.

own plans under the new situation. Dev Plan had a good deal of difficulty in integrating the Arusha doctrine into its own activities, however. Attempts to include regional priorities in the first annual plan in 1970 failed from timing difficulties and even the second time around it appeared that regional submissions often bore little resemblance to the intentions of many ministries for work in the regions. Ministries in fact were not accustomed to planning in regional terms and there was no mechanism for integrating their views with those of the regional economic secretaries.

Before these difficulties could be worked out, TANU issued in early 1971 an important statement concerning Party and public participation in decision making. The statement, called Mwongozo, had almost as much impact in Tanzania as the Arusha Declaration itself. Although in Kenya advisors often fret about the time it takes to change policies, in Tanzania they had to sweat to keep pace with the changes. Even before Mwongozo, there was some indication that social and political objectives took priority over economic growth. A regional development fund had been created in 1967 to permit regional commissioners to fund projects up to shs. 50,000 on their own discretion. The initial aims of this program were to increase economic output, but by 1970 the objectives had shifted toward the inducement of cooperative production efforts.

The two themes of decentralizing decision making and emphasizing social and political objectives over economic ones were accentuated in ensuing years by a massive governmental decentralization program, begun in 1972, and by accelerating attention to the Ujamaa Village Program. For good or ill, the role of planning in government naturally declined as a result. It is worth pausing to consider the decentralization and Ujamaa programs in some detail because of their impact, not only on planning, but on the functioning of the country as well.

Strong economic and social arguments for inducing Tanzania's scattered rural population to live in villages have been recognized for some time. The influential World Bank Mission of 1959 noted the highly satisfactory rate of increase of agricultural products over the previous 15 years but warned that traditional African farming methods would lead increasingly to depletion of soil fertility and to erosion. Even though Tanzania was one of only six countries to have an annual compound rate of increase of total crop output of more than 5% per year since World War II, this was two thirds due to

an expansion of acreage and only a quarter of the increase was attributable to higher yields. The Bank recommended that for the longer run a transformation of agriculture would need to occur so that more productive use could be made of the land while protecting its fertility.

The Bank did not specify how one would deal with transformation as contrasted with improvement programs, but Nyerere saw that the resettlement of the rural population into progressive agricultural villages could meet the economic requirements outlined by the Bank and at the same time provide a framework for social integration.

Consequently, in late 1962, a village settlement program was launched. Regional Party and Government leaders, inspired by a Nyerere speech, promptly began organizing new settlements, often with little or no regard for soil fertility or cropping feasibility in the area selected. These ill-planned ventures were up against heavy odds and most of them quickly failed. The central government set up a commission and organized five pilot projects which were expected to grow to 60 settlements within the 1964-69 Five-Year Plan. Capital investments were to average £ 150,000 each and the villagers were expected to repay £ 130,000 over time. These schemes failed too, both socially and economically. The villagers were reluctant to acknowledge the debt incurred by their settlements and they continually raised new demands for additional governmental support. Partly as a result of research by a group of Syracuse University scholars sponsored by the Foundation, Government recognized fairly early the failure of the heavily capitalized village settlement schemes; the Ross Mission of 1966 officially sealed their fate. The Village Settlement Commission and the Ministry of Agriculture then looked for new methods to accomplish agricultural transformation, but it was President Nyerere himself who designed and enunciated the new policy.

In September 1967, the President issued a declaration entitled "Socialism and Rural Development." It began with a romantic version of traditional African family life extolling the virtues of mutual respect, common ownership of property, and a general obligation to work. This was the concept of Ujamaa, or familyhood, in which every member of a family must have a minimum standard of food, shelter, and clothing before anyone receives anything extra. The President had referred to Ujamaa before, but in this document he extended the implications of the parable considerably. He

said that selfishness and individual advancement concepts stemmed from colonialism, and he criticized as leading to larger farms and more competition the very cash crops which had fueled the country's growth and output since World War II, and even since independence. The President explicitly said that when a farmer needs to employ labor either to plant or harvest his full acreage, the traditional system of Ujamaa has been killed and a class system in the rural areas has begun.

The proposed remedy was the creation of economic and social communities where people would live and work together for the good of all. The President expected that this would not happen in a short time nor would the basic productive unit be the same in different parts of the country. He suggested that to begin with, people should be persuaded to move their houses into a single village, then to plan a communal plot, and finally to grow all plots communally. Although he grounded this idea firmly in Tanzanian traditions, the plan of action is reminiscent of Chinese experience. There the peasants first joined mutual aid teams, then elementary cooperatives which were supplanted by advanced cooperatives and later by communes. The entire process took nine years. It is also notable that the theme of "self-reliance" was prominent in China and in the Arusha Declaration.

The spread of Ujamaa villages was to be a voluntary process, but TANU and the Government bureaucracy were directed to hasten acceptance. Under the 1969-74 plan, Government services were to be made available to Ujamaa villages on a priority basis. James Finucane, a scholar living in the Mwanza region in 1969 and 70, reported a number of distortions in the program as it evolved on the ground. Officials from the region were inclined to report that Ujamaa villages had been formed when in reality very little had changed. Sometimes progressive farmers formally established Ujamaa villages to ensure their access to credit and inputs while they effectively retained control. Finucane also reports a distortion in the allocation of Government resources; for example, 40% of the field staff worked only on the district's four Ujamaa villages which had a total population of 155 out of the 260,000 rural dwellers of the district.

In southern Tanzania, the Ruvuma Development Association was one of the few successful survivors of the original villagization program, but it was in effect destroyed by increasing Government

and Party interest in its activities. Although it had effectively achieved local-level control, and was doing its own planning in accordance with the President's expressed wishes, its independence seemed threatening to TANU leaders and they took it over. The result was a decline in production, a loss of membership and eventually the disbanding of the association.

Despite such setbacks, pressure for the formation of Ujamaa villages has increased to the point where many instances of coercion have been reported. Again, data are difficult to find but membership in Ujamaa villages has apparently increased from around 8% of the rural population in 1971 to an estimated 80% in 1976.

It is difficult to generalize about the success of this movement in either economic or social terms. Agricultural production has been down very seriously in the past three years, necessitating food imports which have virtually eliminated Tanzania's foreign exchange reserves. Adverse weather played an important role in these production trends but opinions are divided on the impact of Ujamaa. Some say that meteorological data do not substantiate the contention that weather was the main source of declining production, but the Government's official line is that the entire drop was due to climatological factors. A reasonable guess would be that the non-voluntary nature of some of the recent village formation and the speed with which the program has been carried out have led to significant losses in production.

The long-range results of the program may nevertheless be positive. Again no data are available, but a knowledgeable observer told me that probably more than half of the new villagers would not return to their former more isolated existence if they were now given the choice. In other cases, particularly where villages have been wrongly sited, some readjustments will eventually be needed.

The impact on planning as a process has been negative. Rural dynamics have changed so fundamentally that conventional planning methods using historical production data are no longer valid. This applies to both supply and demand projections. Mr. Msuya, the Tanzanian Minister of Industry, commented for example that kerosene consumption has suddenly risen to the point where the government/ started searching for

smugglers. It turned out that as a result of villagization, the peasants no longer go to bed when their cooking fires die down but, because they have neighbors to talk with, they buy lamps to enable them to prolong the evening. On the production side, the severity of the shortfall of maize production in recent years has become evident only after the crops were harvested and shipped. This gave the Government very little time to respond to the food emergency.

Decentralization, like Ujamaa, is a concept with a considerable history in Tanzania. The President and his TANU colleagues had apparently concluded even before Independence that the old parish councils should be replaced by development committees at the village level in order to get the participation of local people in planning for their own betterment. In 1962, Village Development Committees were officially established and linked, through district and regional levels, to the national economic planning process. This arrangement lasted for seven years and was replaced in 1969 by Ward Development Committees which were somewhat larger geographically and coincided with district council boundaries. The usefulness of the VDC's was rather limited; Finucane describes in depth the problems they encountered.

In addition to the Village Development Committees, in 1963 popularly elected district councils were instituted which provided important local services and had their own tax resources to pay for a substantial portion of them. As in Kenya, the district councils performed unsatisfactorily and in the late 60's were progressively stripped of their responsibilities for the construction and maintenance of rural roads, the payment of primary school teachers, the control of rural dispensaries, and the collection of most local taxes.

The President's commitment to local decision making was however an integral part of his policy of self-reliance, and he repeatedly stated his intention to find ways to permit people to make their own decisions on things which effected them directly so that they could accept willingly their responsibility for carrying those decisions out. In 1971, Mwongozo called for a larger voice for the people, acting through the Party, in resource allocation decisions. This position could of course be as easily explained in terms of Party-bureaucracy rivalry as in terms of decentralized decision-making.

A number of factors may help to explain the difficulty of instituting effective decentralized decision-making. There is, first of all, a contradiction between the aspirations of a government to effect rapid economic development and social change, and the wishes of the people for more immediate consumption. For example, the people prefer education and health services to feeder road construction, cattle dips and agricultural extension. Secondly, Tanzania had an acute shortage of trained local personnel able to handle management and accounting functions. Thirdly, political and governmental leadership at regional levels was often authoritarian, despite the frequent admonitions of the President; and, finally, there remained the fear that local loyalties were so strong as compared with national loyalties that too much local autonomy was to be guarded against.

The President in 1971 appointed a commission headed by a Foundation consultant, Professor Cranford Pratt of the University of Toronto, and Amon Nsekela, then Minister of _____, to examine the decentralization issue. Later the management firm, McKinsey and Company, was given a million-dollar contract to design a genuine decentralization program for the Tanzanian Government. This move, to hire a New York management consultant firm to design a socialist decentralization program for one of the world's least developed countries, was as audacious as anything Nyerere had done. The plan involved shifting real power and also Government staff from Dar es Salaam to the regional capitals and then downward to the districts. Regional commissioners attained the rank of Minister and became responsible for planning the development of their own regions. Foreign assistance agencies were encouraged to work out programs with regional authorities directly, after reaching agreement in principle in the capital. Some expenditures such as national defense would need to be allocated on a national basis, but 40% of the national budget was to be allocated by the regions.

It is too early to tell what the final outcome will be, but there are disturbing reports on the workings of the new system. It has been pointed out that a shift of power from the central government to a regional headquarters may not really have much impact on the level of participation in decision-making which the people are able to achieve. Secondly, the civil servants were not consulted in advance about the decentralization program, partly because it affected their real interests rather directly. This reduced the political pressures on the McKinsey consultants, but it allowed them to consider their

work as a purely technical exercise without taking into account local attitudes and abilities. It was thus relatively easy to carry out a structural reorganization but it has been more difficult to achieve the necessary attitudinal changes to make them effective.

The McKinsey team had relatively little time to conduct familiarization and training programs to facilitate implementation of their plan. Their lack of familiarity with the administrative culture of Tanzania and their heavily business-oriented experience also led to misgivings on the part of the Tanzanians who were expected to carry through the program.

In practice, although the regions were expected to control 40% of the budget in the first year of the program, in 1972-73 they controlled but 10%, and by 1975-76 had only achieved control of 14%.

The impact of this program on the planning process was again adverse. There will now be a need to assemble regional plans and then to integrate them into a coherent whole rather than planning from the center as in the past. The shortage of trained staff capable of conducting this kind of exercise at the regional level is acute. In addition, the creation of these powerful regional governments has interrupted the flow of statistics so the central Government has even less idea of what is actually occurring than it had before.

To complicate matters further, the Government has decided to move the capital of Tanzania to Dodoma. The move is meant to take place gradually so that of the major ministries, only the Prime Minister's office has so far been moved. This removes the office primarily responsible for plan implementation from the headquarters of the main operating ministries.

The Ujamaa and decentralization programs have thus done much to diminish the optimism felt by Lewis and Helleiner in 1970 that the notion of planning was taking hold in Tanzania. The planning environment has been administratively fragmented and distorted so that realistic planning would be almost impossible even if Government were dedicated to the idea. But the strong tendency, growing since 1967, to favor social and political objectives over economic ones, naturally reduces the usefulness of the planner's tools. Many decisions, such as nationalizations, the pace of the Ujamaa program, the costly implementation of the decentralization scheme, and the decision to construct a new capital at the unlikely site of Dodoma, could hardly be justified in economic terms.

An indication of the priority of social over economic objectives is given by the current Government investment pattern. In 1974/75 the Government's share of total investment increased to 64% from a decade earlier when it was only 28%. Of the Government's investment, agriculture received 11.5%, industry and mining 16.9%, and services (mostly construction) 71.6%. It may also be noted that in the 1969-74 plan, agriculture was expected to receive 13% of the budget but in practice this worked out to be only 10%. In the third five-year plan, that percentage is expected to increase to 17%.

Allied with this preference for social and political objectives is suspicion and aversion regarding technical expertise. John Malecela, in opening a conference on cooperative administration in East Africa in 1971, held forth at length on the irrevelance of planning by foreign economists to the real development situation of a country like Tanzania. He felt that experts who came to stay only two or three years could hardly be expected to make a meaningful contribution to a development plan for the benefit of people they did not know. Many of Mr. Malecela's remarks about the nature of the development task were very perceptive, but the tenor of his speech was entirely contrary to the concept of a technically sound development planning process.

It seems clear that there is little prospect of the Foundation's having had a lasting effect on introducing economic planning as a process of government in Tanzania. Planning now seems to be in lower repute than at any time since Tom Easterbrook's arrival ten years ago. This is not simply a matter of the Foundation's or the Tanzanians' failure to do the job right. The Tanzanian Government has made a conscious decision to avoid the creation of a centralized technical economic planning system in order to permit decentralized decision-making at lower levels of Government.

Our efforts to support training in economics of Tanzanians have been similarly unsuccessful. The returns are not yet in from the program at the University of Dar es Salaam which is now in its final year of Foundation support (720-0216), but it would be surprising if the quality of their economics training was very rigorous. The Toronto program never succeeded in getting the numbers or quality of students from Tanzania for the project to be a success. One could make a case that the Foundation would have been wise to support two or three able Tanzanians for PhD training in economics in the U.K., Canada, or the United States. I'm told there are only two PhD economists in Government, both currently attached to the

President's office, and they could probably use allies in bringing economic factors into the decision making process more prominently.

Despite the failure of the long-term objectives of the program, the effort may have been worth its cost in more immediate terms. Reg Green, Brian Van Arkadie, Bevin Waide, and others were useful and influential during their assignments. Helleiner and Lewis noted that Foundation advisors had contributed to an effective incomes policy, the creation of the Regional Development Fund, the decision to abandon the original village settlement approach, negotiations on the East African Treaty, the establishment of state banks, and even the setting of targets for primary education.

The major policy statements were made by the President himself, however, without consultation with advisors, civil servants, and, quite possibly, with ministers. There was little opportunity therefore to perform the normal advisory function of analyzing the benefits and costs of policy options before decisions were made. On the other hand, at the more routine level of drafting annual and five-year plans, the advisors were able to bring their capacities fully into play. In very few cases did they feel that their time in Tanzania was not productive.

One wonders if the outcome of this program might not have been different if it had been begun, as in Kenya, at the time of independence. By the time our first economists arrived in Tanzania, a short-run plan had served for three years and the first five-year plan was already half-way through its life span. It is at least conceivable that economic considerations would be more persuasive today if a highly qualified advisor with broad development perspectives had been requested by the Tanzanian Government six years earlier.

At the other end of the project, although the Foundation did not overstay its welcome, we might have withdrawn without damage to program results two years earlier. Aldington was an able advisor but was not used to his fullest capacity and felt somewhat handicapped by being the only Foundation advisor in Government.

Public Administration in Tanzania and Kenya.

It may be useful to consider program outcomes in the public administration field in Tanzania and Kenya simultaneously. Despite differences in the initial size and level of Africanization of the two civil services, they have encountered such similar problems that it is instructive to contras each Government's responses to some of them.

We have seen that the first order of business for both Governments after independence was to gain meaningful control over their societies by replacing Europeans and Asians in the civil service with qualified Africans as quickly as possible. The two Governments approached this problem in very much the same fashion, doubtless because their principal advisor on the process was the same man, David Anderson. The same set of tools was employed in both countries, i.e., inventorying key posts and scheduling replacement, manpower planning, manpower utilization, and sharpening the focus of educational and training institutions. Tanzania, starting from a point well behind Kenya in the suppl of trained manpower, pursued these policies and programs with more vigor and determination than Kenya, but both were serious about the need to take command of their Governments and both were successful in doing so earlier than most observers on Independence Day would have thought likely.

It seems to me that in assisting these Governments with a liberal supply of the best advisors whom we or they could identify, the Foundation performed a very considerable service in a situation charged with the kind of emotion it is difficult now to recall.

The job was first of all to help find and train the people to move into the shoes of the departing expatriates, but once that was underway the task quickly broadened to include the creation of new institutions and processes for spreading the benefits of independence more broadly through the population of each country. This task required a good deal of ingenuity as well as careful planning and the staff development advisor, with his colleagues, was central to the process. They did not design the technical programs for spreading credit, education, and technical knowledge in these countries, but they were often called upon for assistance in organizing the institutions, designing appropriate training programs and integrating the new instrumentalities with the rest of Government.

Testimony to the effectiveness of these imaginative efforts is found in both countries where the functions of many of the advisors have become institutionalized. Tanzania now has a Ministry of Manpower Development. In addition to its manpower planning function, it has a Manpower Services Division charged with many of the tasks of the old manpower utilization advisors, and a Personnel Policy Division which deals with much of the load formerly shouldered by staff development advisors.

In Kenya, the Director of Personnel, J. Githengi, credits Anderson with making a real breakthrough by enabling the Government to consider Africanization on a post-by-post basis. There, too, the Management Services Unit thrives despite the misgivings of its designer, Warren Irons -- a computerized personnel roster remains valuable and a Staff Development Unit continues to assist ministries to work out their training programs. Githengi does feel, however, that the Foundation left the administrative improvement field too soon, and too abruptly. Although long-term advisors are no longer required, he would like to be able to rely on the Foundation for ad hoc support for particular cases, such as specialized training needs, which occasionally arise. A similar case was made by Mr. Mwasongw Director of Training and Manpower Allocation, in Dar es Salaam.

Githengi also made the point that in his view the Foundation should have done more on administrative training. Formal efforts along this line have been confined to the construction of the CSTC in Dar es Salaam and later the provision of five man-years of staff time to the Kenya Institute of Administration. The British Government and AID had in our view provided adequately for KIA's staff and financial needs, and while we may have been tempted to become more involved in the East African Staff College on senior level administrative training, the British, and perhaps the Uganda Government, were unenthusiastic about the prospect.

Nor was the Foundation anxious to participate in relatively routine training programs. A trainer cost the Foundation as much per year as an advisor, and it seemed then as it does now that the recruitment of highly-qualified administrative advisors was a better use of funds.

KIA and the Staff College have come under attack recently from a group of British scholars .

/et al,have made a rather elaborate case that the colonial officers in East Africa, once they had accepted the fact of approaching independence, made a belated but determined effort to train African officers who would behave as much like their tutors as possible, thus preserving the system. By replicating themselves as closely as possible, and avoiding a radical change in the system after independence, employment prospects would presumably remain good long after independence had been achieved because of the time it would take to produce sufficient numbers of generalists of the high standard demanded by the system. The argument is also related to the thesis advanced by Colin Leys, who is one of the contributors to Schaffer's book, that the preservation of the system and the gradual replacement of expatriates by an African "comprador-bourgeoisie" made possible the continued exploitation of Kenya by world capitalism. Cooptation is a word frequently employed to describe what happened to the Africans who received the training.

I confess to some bafflement about this line of thinking. It seems to be a minor skirmish in the continuing class struggle between scholars and civil servants. Certainly the colonial governments sought to leave their system intact if possible, just as they left parliaments scattered around the world, but their motives can in my opinion be put down to a desire to preserve what they conceived to be the finest institutions for the purpose of governance. Neither they nor their scholarly critics could propose better alternatives.

I would not argue that the colonial institutions should forever be maintained. There is much truth made in the point by John Malcela in Arusha that one can't build an African house on the European foundations left by the departing colonists. Nevertheless, it should be recalled that (a) there was no alternative African system available at the time for managing a national government and international economic relationships, and (b) the new governments departed briskly from their inherited institutional pattern devised primarily to maintain law and order, by introducing greatly expanded government service for consumption and development purposes. It is true, however, that these new governmental activities were organized and conducted along European lines.

Although the public administration program must be considered an impressive achievement in both countries, two major areas of difficulty still inhibit the effectiveness of public service. The Foundation has not focused seriously on these problems, not because they were unrecognized, but because they were unwieldy. They are the problems first of motivation and morale, and second of local government and rural development.

Motivation and Morale. Fairly early in his East African career, David Anderson observed that, "while we have been fairly successful in inducing specific skills for specific functions and thus meeting the immediate need, we have not yet solved the longer-range problem of producing a self-developing career civil servant. This is partly a question of motivation and ethics on which we need some more research." *

This question of performance and motivation occupied the minds of many people in the mid-60's but no research program emerged from the incubation. A Foundation administrative specialist in 1969 made one proposal to study the aspirations and motives of the work force so that an incentive system could be devised which catered to real wants and needs, but this idea was stillborn. One can only guess at some of the reasons for the Foundation's inaction. The chief one I believe was the unpopularity of the subject among many of the civil servants with whom we were working. Job performance and motivation were not universally recognized to be problems and one ran the risk of being thought offensive if one pursued the subject with conviction.

Training institutions did of course try to instill productive job attitudes in their students but the need for achievement apparently failed to survive the transition from training institution to the job.

At a Foundation conference in Dar es Salaam in 1973, B. A. N. Collins cited a study which found that good relations with the boss, high salary, and security were valued more highly by Kenyan civil servants than challenge or a sense of achievement in a job. Also, better qualified people were

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more easily dissatisfied than less qualified, and authoritarian patterns of management were prevalent but resented.

Both Tanzania and Kenya set down codes of ethics for their civil servants before the end of the decade of the 60's, and here the difference in approach to a problem is revealing. President Nyerere in the Arusha Declaration devoted an extensive section to what he called "qualifications for leadership." There is some evidence that this section of the paper was more important to him than the self-reliance doctrine which involved the nationalization of a number of enterprises. His concern over leadership qualifications had more to do with the danger of the emergence of a ruling class in the Party and the Government than with productivity, and he consequently sought to motivate his people through ideology rather than material reward. The Declaration contained a set of severe restrictions on the uses of influence and private wealth. No leader, government minister, or civil servant down to the middle rank could in any way be associated with the practices of capitalism or feudalism; that is, none should hold directorships in private companies, have two or more salaries, or own houses rented to others.

Typically, Kenya approached the motivation question more slowly, more pragmatically, and more methodically. In May 1971, a report issued by Duncan N. Ndwega, Chairman of the Public Service Structure and Remuneration Commission, proposed a code of ethics for civil servants. The most striking feature of the code was that which permitted, under certain conditions, civil servants to own and participate in private businesses. The Commission reasoned that the private sector, which was being relied upon for the major effort in Kenya's economic development, was able to pay salary scales much higher than those of Government. If the public sector were to follow suit, the serious gap which

(Collins 1973, p 6.) B. A. N. Collins. "Developing Public Management in Kenya", paper delivered at a Ford Foundation Conference in Dar es Salaam on Program Planning in Public Management.

already existed between the poor of Kenya and the members of the public service would increase and scarce resources would be diverted from investment to consumption. On the other hand, if no attempt were made to recognize the differential between public service and private industry remuneration, Government could expect to lose its most able servants.

These two policy declarations have been immensely important in setting the tone and style of Government in Tanzania and Kenya. Tanzania's strict rules have, one gathers, been firmly enforced and Kenya's civil servants have lost no time in making use of the opportunities their code permitted them. Although one must rely here only on anecdotal evidence, it appears that both civil services have declined in effectiveness since the declarations were made. It may be incorrect to attribute, as many do, this decline to the statements themselves because the decline began before the policies were announced. It would seem more reasonable to attribute the deterioration of these services to the gradual erosion of what Goren Hyden calls "the administrative culture." This term implies that a bureaucracy embodies a set of professional ethics which are consistent with the private ethics of the people who devised it, and who in most cases continue to run it. In East Africa, following Africanization, the public ethics required by their Anglo-Saxon style institutions may have been divergent from the private ethics of the individuals who now run the system.

One example of this divergence is the apparently inherent difficulty of assigning individual responsibility for performance. A senior expatriate who had worked closely with a number of ministers in President Nyerere's Government remarked to me that the quality of the ministers he knew was extraordinarily high in terms of their abilities, determination, and integrity. They were not, however, able to exact comparable high-level performance from their subordinates either at the middle or lower levels. One reason for this was their reluctance to attempt to assign individual blame. If something was not done which should have been, they would not seek to identify the person in whom the fault lay. Consequently, the men at the top were extremely dedicated and hard working, but they received weak performances from their supporting staffs.

I pursued this topic in conversations in Kenya and found much the same story. Although

the Ndwega Commission resulted in the adoption of performance appraisals in the civil service, I was informed that they are not in fact used. One reason for this is that when a superior criticizes a subordinate and that person happens to be from a different tribe, the criticism is often taken as an ethnic slur. I was told that there have been cases of Members of Parliament rising to denounce civil servants who had criticized a fellow tribesman.

This reluctance to assign individual blame or responsibility may go even deeper into the culture than the level of tribal competition. In any case, it is deeply rooted in custom and ethics and it deprives the bureaucracy of one of its most important formal sanctions on behavior.

Other cases could be cited where there is a contradiction between private ethics and the ethics of the system, but it may be more useful to turn to a contradiction between the new national ethics and the ethics of the bureaucratic system. A number of observers, including Colin Leys, have noted that the administrative, executive and clerical grades of the colonial civil service conformed racially to European, Asian and African occupations. After independence, the racial barriers disappeared for Africans but the layering of the system remains and promotion from executive grades to administrative grades, for example, is uncommon. This is widely regarded as fostering the growth of a class system in African society, contrary to proclaimed ethics of the Governments.

Local Government and Rural Development

The Foundation refrained from engaging directly in the complex problems of local government despite the strong belief by David Anderson and Frank Sutton that the effectiveness of administration at the local levels was of the utmost importance. This trepidation was based largely on considerations of scale. The number of administrative units and the number of people manning them made the problem awkward for an agency the size of the Foundation. It was hard to see where the addition of a few high-quality advisors or a grant for a single training center would make much difference to the total picture.

Local government problems could not be ignored by the central Governments of Tanzania and Kenya, however; and it is notable that around 1969 both found district level performance so

inadequate that they felt forced to centralize a number of revenue collection and payment functions previously left to the districts. This gathering in of powers was done reluctantly in both cases; it ran counter to President Nyerere's expressed intention to decentralize power and to Kenya's concurrent attempt to institute provincial and district-level planning.

Neither Government gave up its intention to decentralize functions but again the Kenyan response was slower and more methodical while the Tanzanian response was to make a "great leap forward." The Tanzanian decentralization of 1972 constituted the great leap. It was as audacious as the Chinese movement by that name and may turn out to be proportionately costly.

The literature on local government and rural development in East Africa is extensive. The picture is too complex to receive justice in this account, but some observations from Philip Mbithi, James Finucane, Jon Moris, and Robert Chambers may be noted.

Local government suffers from all the problems of motivation and morale of central government, but these are compounded by the factors of distance and isolation. Communication is of tremendous importance, particularly when power and authority are heavily vested in the ministries in the capital city. There is a tendency for one-way communication, from the top down, to predominate in these systems for a number of reasons. These include the habit of authoritarian relationships which are common in the bureaucratic hierarchies, the practice of promoting or transferring the more able local government officers to the center, and the greater availability of secretaries, typewriters and supplies in the capital.

Communication laterally among ministerial representatives at provincial and district levels also tends to be poor, and Philip Mbithi has written persuasively about the problems of communications between local government officials and the people.

Finucane notes that the practice in most countries has been to rely on a modernizing bureaucracy as the agent of change in rural areas, but that this practice is not notably successful. He observes rather sourly that the Tanzanian leaders have specifically rejected this approach, seeking instead to decentralize power and involve the participation of the people in decision-making, but that to date the result has been much the same as in Kenya where a different philosophy of government

prevails. Finucane and Mbithi emerged from their studies with the strong conviction that increased participation in decision-making at the local levels is essential for genuine rural development. Just how this can be brought about is somewhat less clear.

Jon Moris has had many years of experience in rural East Africa as a scholar and administrator. In a paper delivered to the International Conference on Management Education for Africa in November 1976 he examined some of the reasons for the extremely low level of performance encountered at the local government level in both Tanzania and Kenya. He makes the case that the Western management tradition is inappropriate to rural East African realities. His case is admirably documented, thoughtful, and persuasive. He finds the western tradition culturally inappropriate, dependent on value systems and thought patterns not reinforced by the local culture, and requiring levels of equipment and methods of organization that are simply unavailable at the local level.

Robert Chambers, who led a team evaluating the Special Rural Development Program (SRDP) in Kenya in the early 70's also focused on management as the chief obstacle to the success of rural development innovations. He devised and tested a programming and implementation management system (PIM) which worked with some success in the SRDP but seems to require very high-level analytical and administrative inputs at the top.

These and other valuable studies point to the conclusion that local government is not performing satisfactorily in either Kenya or Tanzania; but the studies and additional anecdotal evidence give the impression that the situation in Tanzania is considerably more desperate than that in Kenya. This conclusion is drawn from a very unscientific sample of information sources but there are strong reasons to believe it may be true.

The first is of course the initial conditions which favored Kenya over Tanzania. As a result of the Emergency, by the time of Independence the Kikuyus in Central Province were already living in villages well served by access roads, and a land consolidation and registration campaign was fully underway. In addition, the educational infrastructure was considerably more developed, providing more trained people to serve in local government posts.

The second factor has to do with the dynamism of local society in the two countries. Perhaps as a result of Tanzania's serious efforts to decentralize decision-making and prevent the rise of unequal classes in the society, the only viable rural organizations in Tanzania seem to be TANU and the government bureaucracy. Finucane's account of the decline and disappearance of the highly-successful Victoria Federation of Cooperative Unions described a process which apparently also occurred in the Wachagga area in the coffee-marketing cooperative. Despite the emphasis on self-reliance in Tanzanian ideology, it seems that Tanzanian peasants have become more dependent than ever on the State and Party bureaucracies.

In Kenya a somewhat different picture emerges. The Harambee self-help movement has received a good deal of scholarly attention. Initially Harambee groups were organized to construct school buildings which the Government was then expected to staff with teachers. The movement has been viewed critically as a method of local extortion of governmental services. Occasional confiscatory or coercive methods were used in gaining participation at the local level. The movement, however, has not only survived but expanded to the point where cooperative effort is no longer confined to a local clan or community but now often encompasses provincewide cooperation for the building of technical institutes. The Education Commission now sitting in Kenya is planning to recommend that the Government build no more secondary schools, relying entirely on Harambee financing and construction.

An interesting feature of the Harambee movement is its ability to command the participation of local people who made good. Government officials in Nairobi are expected by their home communities to contribute personally to the effort both financially and by working to secure the central Government's support for local projects. For one generation at least, the movement is providing an important continuing link between the governmental elite and the rural areas from which they came.

Chambers also refers to groups of women in rural Kenya who banded together to raise funds to put iron (mabati) roofs on their houses. Having achieved success in their initial objectives, they

have gone on to buying grade cattle, fencing dips, building better kitchens and lobbying for improved services from Government. In the Wakamba area, other women's groups called Mweithia have organized to do communal work such as bench terracing.

Much of the dynamism in rural Kenya is due to private enterprise. Small shopkeepers and local transport companies proliferate, at least in the more advanced provinces. The transport companies may be particularly important. In Tanzania one hears that peasants are reluctant to produce a surplus because of the difficulty of obtaining transport from the nationalized industry and the cost of it when it is available.

All this is not to imply that rural development is proceeding apace in Kenya and is totally stagnant in Tanzania. The ILO Report and the 1974-79 Development Plan both indicate concern over the relatively slow pace of rural advancement in Kenya, and certainly the pace of activity varies greatly among provinces. Other reports indicate that agricultural and educational innovations have been more rapidly adopted in Tanzania than in Kenya.

In general, however, the impression I gained from talking with a broad range of people is that the farmers in Kenya are doing better, and the people in general are better off, than those in Tanzania. One comparative example may illustrate the point:

A tea company with plantations and factories in both countries finds that the production and processing costs of the finished product is Shs. 5.85 in Kenya and Shs. 7.35 in Tanzania. In both countries, small holder production is processed in the factories. The farmers in Kenya receive Shs. 1.20 per pound and those in Tanzania Shs. .90.

The difference, according to the knowledgeable person who told me of these prices, is accounted for by minimum wage laws in Tanzania, the low productivity of the workers, and the fact that the Tanzanian peasant must sell to a state-owned marketing organization rather than directly or through a cooperative. It may be argued that the higher cost of production is to Tanzania's advantage, assuming that the market clears the amounts available for sale and no expansion of this type of production is desirable. But it is hard to see any advantage accruing to Tanzania from the lower

price received by its producers.

Management Program

Having succeeded in gaining control of government through their Africanization programs, both countries next turned their attention to achieving meaningful control over their economies. The pattern at independence was similar in each, although Kenya's economy was considerably more developed. Europeans controlled plantations and large farms, and Europeans and Asians controlled import/export businesses, distribution and what manufacturing existed. The extensive and varied efforts to gain control by the East African governments are too complex to examine here in detail, but the difference in general approaches is neatly summarized by the following excerpts, the first from a speech by President Nyerere in 1968 and the second from "African Socialism and its Application to Planning in Kenya" :

> "Ideological differences between countries affect the method, not necessarily the fact, of securing national control. The real ideological choice is between controlling the economy through domestic private enterprise, or doing so through some state or other collective mechanism. But ... it is extremely doubtful whether it is a practical choice for an African nationalist. The pragmatist in Africa ... will find that the choice is between foreign private ownership on the one hand and collective ownership on the other... a capitalistic economy means a foreign controlled economy ... The only way in which national control of the economy can be achieved is through the economic institutions of socialism." *

Quoted by Dr. Reginald Herbold Green in his paper entitled THE PARASTATAL CORPORATION AS AN ELEMENT IN THE QUEST FOR NATIONAL DEVELOPMENT: TANZANIA 1967-1972. Originally from "Economic Nationalism" in Uhuru na Umoja, Oxford University Press, Dar es Salaam, 1968, p. 264.

* Speech by President Julius K. Nyerere 1968

> "Under African Socialism the power to control resource use resides with the State. To imagine, however, that the use of resources can only be controlled through their ownership or that the appropriate ownership will guarantee the proper use of productive assets are errors of great magnitude. Ownership can be abused whether private or public and ways must be found to control resource use in either case." **

The difference in these two policy statements parallels those found in the section above; Tanzania dramatically and ideologically confronting a problem while Kenya approaches it more gradually and pragmatically.

President Nyerere's nationalization program, begun immediately following the Arusha Declaration, was anything but a pragmatic move. Parastatal organizations already in existence were having severe management problems; i.e., COSATA, a state trading firm set up by Government to compete with Asians in distributing goods, had to be retrenched because of operating losses; and big game hunting, nationalized in 1966, was denationalized in 1967 after the state company lost $250,000. Investments by state enterprises were running at only one third of planned targets; therefore, the President's decision to turn a substantial responsibility for agricultural credit, marketing, and milling over to state corporations seriously increased the demand for managers at a time when they were already in critically short supply.

Thus it was not surprising that when the Foundation decided to shift its program from the staff development field where the Africanization process had largely been completed, and to scale down its work in economic planning, it should turn to public management as a high-priority field of endeavor.

Training was to be the main theme for the public management program which had as its objectives support for the development of African self-reliance. Since self-reliance depends on attitudes and competences, training is presumably the best way for an aid agency to foster its development.

** African Socialism Paper, 1965 Page 11

The public management program has had nowhere near the impact on East African development that was achieved by both the Africanization and economic planning programs. There are a number of obvious reasons why this result could have been expected, but they do not include the inadequacy of staff work in developing the program. Indeed, when one reviews the conferences, experimental projects and staff analyses which went into designing the public management program, he is struck by how much more Foundation staff effort was involved than was true in the earlier cases.

Our work in staff development and manpower planning was designed by David Anderson and Robert Thomas in Tanzania and replicated with some variations in Kenya, Zambia and Botswana. The conceptualization of the program by Kingsley and Thurston was valuable, but it did not and could not draw out an elaborate plan describing the eventual evolution of these activities.

Similarly, the economic planning program was designed in Kenya primarily by Edwards working in the Government itself. The representative and his staff maintained financial control of expenditures but could not have designed the program as it evolved.

The public management program didn't spring full blown from the representative's office. A great deal of consultation with African officials and others working in the management field went on informally as well as in conference settings. Nevertheless, the program did not evolve from within Government on the basis of experience, as did the others, and that may have been a drawback to its success. The fault cannot be laid at the door of the Nairobi office. The operating style of the Foundation had so changed in the ten years since we began work in East Africa that it had become necessary to articulate strategies and plan budgets one or two years in advance in ways that would be found convincing in New York. This process always has an element of unreality about it because it requires a degree of clairvoyance and creative imagination on the part of the field staff in addition to an ability to communicate a wide range of intangibles concerning operational conditions.

A second factor affecting program prospects in public management was that after ten years of Independence, the East African Governments were less fluid and open to advice than they were in the early years. At Independence the new Governments were rather desperately in need of trustworthy

advisors. The range of subjects on which the opinions of Anderson, Thomas and Edwards were sought far exceeded their specific tasks; they became trusted confidants, not just sources of technical information. In the course of time patterns and policies jelled, leaders became more experienced and a greater supply of qualified local manpower was available; consequently, it would have been surprising if any outside assistance program could have had the vital impact of the earlier ones.

Thirdly, full agreement was never achieved on the directions the program management program should take. It was less a question of strong competing strategies than a sense of uneasiness that any of the strategies proposed would really make much difference to the quality of management in East Africa. This reflected an awareness of the depth and breadth of the problem and of the meager resources the Foundation could devote to dealing with it. The East African budget was declining in dollar terms, the dollars were declining in value, and existing programs could not be terminated abruptly in order to free up substantial sums for new projects. Consequently, the East Africa office found itself attempting to do something about the most pervasive development problem of the region, simultaneously in five countries, with pitifully small funds.

The above reasons are in themselves fully adequate to explain the relative lack of success of the public management program to date, but there remains a more nebulous factor which needs to be considered: the cultural factor of management, which Hyden, Moris and others have been grappling with.

Many people have commented on the cultural dimension of management. It generally appears around the end of the list of any diagnostic treatment of the shortcomings of management in Africa, the Middle East, and probably Asia and Latin America as well. Having labeled the problem however, it is difficult then to devise ways of dealing with it.

Most often cultural traits are deemed to be obstacles which should be overcome by training. Indeed, it is difficult to avoid this viewpoint in the context of managing particular industries. The technology of a steel mill or an oil refinery, for example, dictates to a considerable extent the kind of behavior which will be required to make it function effectively. One suspects that, in less capital-intensive industries and service organizations, technological demands are less rigid, but it is difficult to find cases where management systems have been analyzed and designed to fit more comfortably the

values and attitudes of the people who are to run them.

One would think that it would be possible to analyze the methods and skills employed in modern management in order to determine the cultural sensitivity of each element. For example, financial and technological subjects (with due regard to the considerations of appropriate technology) would presumably be at one end of the continuum, while personnel management and organization might appear at the other. In other words, those elements involving financial or physical dimensions would presumably have more universal qualities, while those involving human relationships in the enterprise would be tailored more particularistically. On the basis of such an analysis it might be possible to devise management systems more appropriate to the culture in which the entreprise is meant to function.

It is important to note here that the tendency of international training programs to rely on a rather standard western curriculum is not simply a question of cultural imperialism, cooptation or some other evil design. Indeed from what I've been able to discover, the westerners involved in the Foundation's public management program were more concerned about the cultural problem than were their African colleagues. Significantly, both Tanzanian ministers with whom I discussed our program efforts felt that the Foundation had performed well in the economic planning, staff development and manpower planning programs and left at the appropriate time; but had abandoned efforts in the management field too soon. As Mr. Msuya succinctly put it "there is a science of modern management which we need to learn."

One can readily understand the priority attached to the subject by these Tanzanian leaders. The East African Standard carried an article in December 1976 which purported to be based on a report by senior Tanzanian officials to President Nyerere on the state of the economy. After detailing gloomy figures of declining agricultural output and rising balance of payments deficits, the article makes the startling statement that 24 major nationalized companies between 1969 and 1973 had cumulative losses equal to 91% of their total share capital. This figure, which has not been denied by Tanzania to my knowledge, lends credence to the raft of anecdotes about managerial incompetence which circulate in Dar es Salaam. The seriousness of the problem is underlined by the fact, duly published in the Tanzanian Nationalist that for the last two successive years the Government Auditor has been unable to

ascertain the financial position of many companies in the parastatal sector because of the inadequacy of financial accounting.

It thus seems clear that the management problem in Tanzania has reached crisis proportions, but that the Foundation is not, in the short run, in a position to do much about it.

Conclusions

The major force affecting program outcomes is often the political climate of a country and its relations with its neighbors. In Kenya and Tanzania we have been fortunate in being able to work with unusually stable regimes led by political groups with fairly clear ideas of the directions in which they wish to lead their countries. The remarkable divergence of these chosen directions, and the Foundation's ability to work amiably and intimately with both for so many years, is testimony to the broad political latitude which the Foundation can encompass. It can also be said that the continued prestige of the Foundation in Tanzania and Kenya is a fair indication that both countries consider it to be an ally on development problems.

As events have unfolded it has become apparent that some of the Foundation's programs were more consistent with the national aspirations of these governments than others. We have placed greater stress on sound economic planning in Tanzania than the Tanzanians did, and our advisors seem to have been somewhat more seized of the importance of equity problems in Kenya than was that government.

There is no doubt however that in the early days of independence, Foundation assistance to both countries in their efforts to gain control of their bureaucracies and, somewhat later, their economies, was of major importance. Despite the writing of Professor Schaffer and his colleagues, I think there is little disagreement with the statement that the Kenya Government is fully controlled by Kenyans and the Tanzanian Government by Tanzanians. On the economic side, however, there is more controversy.

There is a prominent school of thought, most ably represented by Professor Colin Leys, which holds that the Kenyan economy still dances to the tune of international capitalism, a force which exercises control through a "comprador-bourgeois" class of Kenyans. The powerful impact of the world economy on the fortunes of small, primary product-producing African states can hardly be denied, but Guy Hunter and Ronald Dore have ably dealt with Leys' proposition that the international economic order operates intentionally and inexorably to exploit and repress the countries on the "periphery ." They see instead a situation where the cards aren't stacked against Kenya but must nevertheless be played skillfully if that country is to maximize its economic returns.

The Foundation's economic advisors to Kenya have played a key role in the arena of international economic relationships. These relationships encompass a broad range of foreign exchange and trade policies and of aid and private investment negotiations. On this range of matters it seems to me the case is strong for continued assistance. It will be some time before a Kenyan with the experience, maturity, and professional skill required of a senior economic advisor can be induced to work in that role rather than accept the other opportunities open to him. Such a person would presumably be in demand for ministerial posts or for dealing with domestic economic policy issues where his knowledge of the society could be combined with his exercise of analytical skills. Nor do I feel that the provision of a foreign advisor to such a post detracts from national sovereignty any more than seeking professional help to fill out income tax returns detracts from individual autonomy. Thus it seems to me the Foundation should respond favorably to the Kenya Government's request for further assistance until such time as it can obtain similar-quality advice from a source in which it has equal trust.

Tanzania has made a more determined effort to free itself from international economic dependency, but the result may be the opposite of that intended. Bad weather, rising oil prices and international inflation are of course beyond Tanzania's control, but declining domestic output has seriously increased the country's indebtedness. This is bound in one way or another to decrease the degree of self-reliance possible for the country.

Despite the seriousness of the situation, I doubt there is anything the Foundation can or should try to do to be of assistance under present circumstances. Nor do I believe that economic advice if offered would be particularly welcome. If Tanzania decided to alter its present policies radically, it is possible that the Foundation would be called upon for assistance. I find it unlikely, however, that the Government will fundamentally change course. In the past when a change in direction seemed called for Nyerere invariably veered left. Although he obviously admires the Chinese, he has not developed their flexibility in retreating from policies which have unintended effects, such as the Let-All Flowers Bloom campaign and the Great Leap Forward Instead, after promising no further nationalizations, beyond those designated in the Arusha Declaration, the Government has proceeded to take over virtually the entire economy, undaunted by its obvious inability to run what they already had. It would doubtless be very difficult to retreat from the present position. Party and press pronouncements have continued to signal victories whenever the state extended its control and the lively press in Kenya would be quick to point out with some glee any backsliding on the principles of Tanzanian socialism. Thus it seems more likely that as the crisis deepens in Tanzania, the turn will again be toward the left, possibly leading to the creation of a vanguard party with increased power over the Government and the people.

This is not a prophecy; I certainly have too little recent experience to speak confidently of future directions in any East African country, but I think the Foundation would be wise to refrain from new initiatives in Tanzania until President Nyerere has clearly decided on a new course. I am assuming that a new course will shortly be needed, partly because of the worsening economic crisis and partly because I doubt that democratic socialism can stand the strains of recent pressures to force the pace of Ujamaa villages.

Functioning of Government. Local government seems to be a major problem everywhere. But even at the center we have noted a general decline in the administrative capacities in both Tanzania and Kenya in recent years and suggested that this is an inevitable decline which can be slowed but not reversed by Foundation action. The institutions must naturally be expected to change in character once they are run by Africans and not by Britons. They can also be expected to decline in efficiency since they were designed by and for the British, to be used for the maintenance of control. One can assume that the process of change has only really begun, and even in Tanzania they are a long way from an indigenous form of governance.

The question remains, from where will this new form emerge? It is possible that it will evolve out of the systems which currently manage the affairs of State. An indigenous system may emerge in West African countries first because they reached independence somewhat earlier and have encountered first some of the social problems which later arrived in the east. The Foundation might encourage reflection on the evolution of colonial bureaucracies into the national systems by some of the elder statesmen of the AAPAM, such as Yao Adu and Chief Udoji. These men and others like them have witnessed several "generations" of change in the public services of Africa and have already noted some observations on the process. Perhaps they could be induced to speculate on the systems which may emerge in the future.

In the shorter run, I doubt that any persistent efforts by the Foundation to improve the quality of public service in either Tanzania or Kenya are warranted with the exception of the B. Phil. program. Good men in both Governments will, I'm sure, continue to do what they can to improve training and organization, but the outside support they need on a continuing basis can presumably be found from other donors. The Foundation has, however, been unusually valuable in recent years in supplying consulting assistance to important governmental commissions, and this might very well continue. In addition to the services of a project specialist, the Ndegwa Commission in Kenya benefited from a Foundation-supported contract with API, a California-based consulting

firm. In Tanzania a major governmental management training study was conducted in 1975 under the direction of the then representative, David Anderson. To continue to meet such specialized needs effectively, the Foundation will need to remain in touch with several key figures in the public services. This will doubtless mean that other requests for special travel or training programs would need to be handled. It seems to me in terms of continuing good relations with these governments and a shared interest in the functioning of their public services, that a limited amount of time and money should continue to be made available in this field.

Continued support for the B. Phil. program is warranted because it is an essential ingredient to maintaining the professional quality of the planning program. Training, experience, and professional designation have produced a small corps of people who accept the values and attitudes of economic planning and command some of the economist's skills. In the future, it would seem to me more important to deepen the knowledge and professional commitment of the economic service than to expand its numbers greatly. Economists will continue to be in short supply, but the integrity and approach to problems which the Economic Service should represent is perhaps more important than its breadth. I should think more opportunities might be found for professional enrichment, seminars and other identity-building rituals for the members of the Service.

I'm not sanguine about the decision to assign members of the Service to regional and district planning posts. The professional armor of these new knights of impartial rationality may be too thin to withstand assault alone. The possibility might be considered of inviting several countries to send graduate students in development economics to work alongside these Kenyan officers in the field. The foreign students would learn a great deal, and the Kenyans would be bolstered by the presence of professional allies.

The new Goverments and the Foundation's programs themselves have generally encountered most difficulty when they sought to promote development in the rural areas by extending services and engaging in planning at district and regional levels. The results of Tanzania's frontal attack on this problem, the decentralization program initiated in 1972, are not fully in, but the fragmentary reports so far available give little grounds for optimism. feel that both Governments rely too heavily on bureaucratic methods in trying to mobilize the countryside. The administrative culture, which is so difficult to maintain in the capital city, must obviously suffer even greater erosion when the subordinate workers are physically divorced from their superiors. Obviously, the traditional culture and traditional values are likely to be more powerful in rural areas than in the capital. The effectiveness of TANU and the State bureaucracy in foreclosing organizational alternatives in the Tanzanian countryside is one of the most discouraging factors in that country's situation. In Kenya, the dynamism of the Harambee, Maboti and Mwelthic movements is more encouraging, as is the vitality of small private enterprises.

Although East Africa is extremely fortunate in the amount of research which has been done on various aspects of rural development, that which I have seen generally incorporates a perspective somewhat counter to my own biases. Goren Hyden's impressive study of cooperatives in Kenya for example focuses on the deleterious effect of "mechanical solidarity" by which he means loyalty to family, clan or tribe. Mechanical solidarity is contrasted with organic solidarity which is based more on conscious occupational or class interests. There is a presumption in this work and in others that organic solidarity is more advanced and more desirable and the other type needs to be eradicated as soon as possible. All this may be true, but in the short run one should at least examine the possibility that the greatest gains in output and social development may be available through the use of existing loyalties and identifications, rather than through

opposition to them. The sine qua non for cooperation of any sort is a community of trust. It seems doubtful that one can legislate or achieve through ideological pronouncements the broadening of this basis of cooperation as rapidly as it can be achieved through exercising the potential that already exists. Chambers, for example, notes in passing that the Harambee movement was originally built on clan-level groupings but in recent years it has become possible to broaden cooperation in order to achieve larger projects, such as construction of technical institutes. One wonders if the movement would ever have been launched if it had had to begin at the level of cooperation it has now achieved.

Albert Maleche, referring to the typical African management trainee, already in some sense a member of the elite, says "his deeper patterns and relationships have already been formed and determined within the kinship setting. Furthermore, as we see continually, the demands or obligations and concerns of kinship are not compartmentalized, but themselves permeate and effect the working situation."

It may be feared that by recognizing the legitimacy of these primordial associations, they will be strengthened and national unity endangered. This is certainly a legitimate fear, as the examples of Cyprus, Northern Ireland, Quebec, and Lebanon remind us daily. On the other hand, there is some evidence that the repression of subnational loyalties which in fact exist will lead to the distortion and corruption of whatever system is adopted and eventually the repressed forces are likely to erupt again. The answers to all this are far from clear, but a study by Lloyd and Suzanne Rudolph of the growth of caste associations in India is worth serious consideration. Some of those associations, originally created to win gains in status for the caste to which the members belonged, evolved into more modern, achievement-oriented organizations with broader and more cooperative functions. It may be the case that human development is itself a process of gradually broadening empathy, but this does not necessarily mean that the fastest feasible route to eventual

goals is the most direct. It seems to me not only possible but likely that President Nyerere's enunciation of 21st century ideals is retarding rather than advancing the progress of his countrymen in that direction.

The implications of all this for our programs in East Africa are not immediately evident. It may be useful to explore these ideas with such scholars as Philip Mbithi and Goren Hyden; then perhaps examine the need for training programs for local organizations. Accounting, technical and leadership training are presumably needed by the voluntary organizations already functioning but adequate facilities may already be available for them. *

At the national level, the work of David and Audrey Smock which appears in the Politics of Pluralism is extremely relevant. Although it's unfashionable to look to Lebanon for political models these days, the Lebanese National Pact served for more than 40 years to establish guidelines for the allocation of political power among competing religious groups in that country. I continue to think that the Lebanese achievement in maintaining a reasonable degree of stability, an extraordinary degree of growth, and freedoms of press and association unparalleled in any other Arab country, through a period of extreme regional turbulence is worth careful consideration by countries such as Kenya which are threatened by internal ethnic divisions. But this is a position the Smocks are much more able to elucidate than I.

It will be evident from the foregoing that I see little hope of success for the public management program in East Africa with the emphasis on training and the parastatal sector. Most of the industries nationalized by Tanzania require some form of modern management; that is, it would be feasible neither to turn them over to a tribal or kinship association to run nor can a more Tanzanian system for managing complex enterprises be devised in a short time. Wherever possible, I

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* John Gerhardt reports that cooperatives have generally not been effective agencies for dissemination of improved agricultural technology. Have members of these cooperatives been selected for short extension courses?

should think Tanzania would be better served if it would either dispose of the industries or put them under external management contracts. In the case of transport, the job might be opened to cooperatives or private ownership. The cost of the present wasteful system must in the end be borne by Tanzanian peasants, and it doesn't seem to me that the pride one can take from local management is adequate recompense for the losses made by the enterprises.

The public enterprise sector is bound to remain large in Tanzania, and the citizens who serv as managers badly need training. I doubt that the Foundation has a unique contribution to make in provid it. Our experience seems to be that only when large investments over a long period of time are feasible have we been successful in creating effective management institutions. Ewald Rebeling, when he left his assignment at the parastatal management development unit in Zambia was frank enough to say "the Ford Foundation does not seem to have sufficient experience for embarking on practical projects in direct assistance to management." I think that others can do as well if not better than the Foundation, and that no one will succeed in Tanzania very gloriously.

In Kenya there has been less demand for work in the management training field as such. The Kenyans were, in my opinion, more sensible in permitting meaningful foreign participation to continue in the modern sector of their economy. Kenya has been criticized, I suspect rightly, for providing too much protection to new import substitution industries. The continued inefficiency of these industries is a tax of the same kind (but in practice a lesser degree) as that levied on Tanzanian society by the nationalized sector.

Both Kenya and Tanzania are victims, in a sense, of an essentially Western debate over social values. Kenya has followed a sensible, growth-oriented strategy, based to a reasonable degree on economic analysis. In this it has been remarkably successful, although it has had to pay the penalty of the emergence of a dual economy and the skewed income distribution inherent therein. Tanzania has equally successfully sought to avoid the damaging social effects of a dual

economy, achieving admirable income distribution patterns and relying generally on class analysis for guidance. The debate between Kenya and Tanzania over their respective strategies is generally expressed in growth and equity terms which are reminiscent of the post-war European ideological competition.

But the Europeans could afford to debate the merits of growth and equity, freedom and the proper role of the State, without becoming unduly engrossed with the problem of raising the general cultural level of the population to the point where it could design, produce and use modern technology. In East Africa, cultural development may be the main task; undue stress on either growth or equity at this stage may retard or even defeat the broader development effort.

A new research horizon would be opened by the addition of the human development perspective to the assessment of East African strategies. One needs to ask what changes in competences and attitudes are fostered through participation in cooperatives, Harambee and other voluntary organizations, irrigation schemes and small private enterprise. This is a dimension of the development process too often lost sight of in our concern for the orderly functioning of the essential central planning and administrative capacity of government. Human development and cultural change are very long-term phenomena; clearly we were right to attend first to the urgent priorities following Independence of helping the Africans become masters of their own households. Perhaps now it is time to address the longer-range questions involved in the evolution of a truly African modern society.

As Namibia and Zimbabwe gain independence and majority rule, they will be addressing many of the same problems which the Foundation helped the East African governments deal with in the programs under review. At the appropriate time, the Foundation might consider sponsoring jointly with the Governments of Tanzania and Kenya seminars on the staff development and manpower planning programs in Dar es Salaam, and the staff development and

economic planning programs in Nairobi. The valuable experience gained in these countries is now being put to good use in the Foundation's program in Botswana; it could prove valuable elsewhere in southern Africa. If so, I hope the Foundation will seek not only to accelerate the orderly pace by which Africans gain control of their governments and economies, but also to limit the size of the modern sector, both government and private, so more resources will be available for development of the vast majority of the people who live in rural areas.

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AFRICAN RURAL SOCIAL SCIENCE STUDY

Consultant Report

To ISNAR

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Dr. Gaston V. Rimlinger

August 1, 1981

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AFRICAN RURAL SOCIAL SCIENCE STUDY

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AFRICAN RURAL SOCIAL SCIENCE STUDY

CONSULTANT REPORT

TO

ISNAR

Dr. Gaston V. Rimlinger

August 1, 1981

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Dr. G.V. Rimlinger was formerly economic program advisor for the Ford Foundation in West Africa and has served as a consultant to governments in Africa and the Middle East. Currently, he is Professor of Economics at Rice University, Houston, Texas, U.S.A.

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INTRODUCTION

Over a period of two decades since independence, the African countries have made remarkable progress in establishing modern institutions, training indigenous manpower and developing centers of knowledge. Yet, there are still serious weaknesses in crucial areas, one of which is agricultural and rural development. Awareness of this problem area has led ISNAR to respond to suggestions by the International Development Research Center (IDRC), the Ford Foundation and African leaders that an investigation be undertaken to examine the state of manpower and knowledge in the rural social sciences in Africa. The IDRC and the Ford Foundation agreed to finance the investigation, and ISNAR took on responsibility for its execution.

The specific terms of reference for the study were:
"To review the availability of African social scientists in universities, research institutes and ministries concerned with agricultural research/ development. At the same time look at the need for additional trained personnel and the demand for the services of additional persons if they became available". Furthermore, the terms of reference state:
"If it appears that additional training is required either within or outside Africa, or both, then program recommendations and a specific plan would be put forward in close consultation with the African Advisory Committee".

Two comments on these terms are in order. First, the implicit hypothesis underlying the investigation is that shortages of trained people and inadequate scientific knowledge in such fields as agricultural economics, rural sociology, anthropolocy, and geography are causal factors in the poor performance of African agriculture. Second, the terms provide that the investigation and the formulation of recommendations be guided by an African Advisory Committee.

An organizational meeting for the project was held in New York on March 11, 1981. It brough together people knowledgeable about Africa from various foundations and organizations. At that meeting three criteria were adopted for selecting the sample of African countries to be investigated, namely: (1) availability of training capacity, (2) institutional uniqueness, and (3) regional and cultural representativeness. On the basis of these criteria, and taking into account the time constraints of the investigator, the following nine countries were selected: Cameroon, Ivory Coast, Kenya, Nigeria, Sudan, Tanzania, Tunisia, Upper Volta, and Zimbabwe. Criteria were established also for selecting the African Advisory Committee, namely: (1) professional qualification and reputation, (2) geographic identification, and (3) career background and likelihood of interest.

The field investigation took place from May 16 to July 18, 1981. It was not possible to meet with all members of the Advisory Committee at one time. The first meetings were in Nairobi with four members at the beginning of the tour. Later meetings were held in West Africa with the remaining members of the Committee.

PART I

General Report

Chapter 1

Main Findings

1.0. Some Comments on African Agriculture.

An important part of the hypothesis underlying this investigation is that there are serious problems in African agriculture. This is not the place to review such an important topic, but a few observations may be relevant. It has been well established that African agriculture, especially the production of food, is facing major difficulties, and if present trends continue the Continent runs the risk of major disaster before the end of the decade. While the situation with regard to food self-sufficiency varies widely between countries, the overall trend in per capita food production in Sub-Saharan Africa has been consistently downward for the last two decades. According to a recent U.S. Department of Agriculture study, the per capita food production in 1978 in Sub-Saharan Africa as a whole was less than 80 per cent of the 1961-65 average. In most countries of the region, per capita calorie intake falls below minimal nutritional standards.

The problems of African Agriculture have a Continent wide scope. They are not restricted to specific regions, particular economic systems or political regimes, or to specific policies or systems of property rights. Behind the statistics of declining per capita food production and subminimal nutrition, there is a whole host of problems. In the most general sense it is the failure to develop, to transform and modernize, the peasant sector of African agriculture.

This is the sector where the overwhelming bulk of the food production takes place. The neglect of the peasantry is the consequence of development policies which have favored the modernization of industry, the development of large-scale capital intensive agriculture, and generally, agriculture oriented toward export crops. The result is not only a shortfall in food production but the appearance of an increasingly sharp economic and social dualism between the favored and the neglected agricultural sectors. This dualism tends to undermine not only the neglected sector but threatens the whole system. The neglected sector is progressively deprived of its most dynamic elements through the steady departure of the young and the disdain of those who acquire the rudiments of education. Very often the neglected sector represents also a neglected region and ethic group, which has significant implications for social and political stability. In many countries where modernization has taken place at the expense of the peasantry, the limits of this process have now been reached. The growing need to import food at high cost has made governments realize that the road toward further development is no longer import-substitution industrialization but import-substitution agricultural development.

The biggest challenge facing African today is the need to increase agricultural productivity on a wide scale. This can be done only through a broad transformation not only of production methods but of rural life. The people, the knowledge, and the skills required for this transformation

are a matter of prime, though not exclusive, concern of the rural social sciences in Africa.

2.0. The Role of Social Science in African Agriculture.

The notion that social science, or more specifically rural social sciences, have any relationship to the shortcomings of African agriculture calls for a brief examination. This is necessary in order to clarify the meaning of the main hypothesis underlying the survey. It should be made clear at the outset that there is no implication here that a shortage of agricultural economists or rural social anthropologists is the only or even the chief cause of low productivity in African agriculture. As everyone knows, there are a great many causes including inappropriate policies, inadequate management, unproductive soils, unfavorable climate, insufficient or inappropriate equipment, lack of funds for fertilizer, inadequate physical infrastructure, undeveloped marketing channels, inadequate incentives, conflicting values, and so on. The point that was brought out at the Nairobi meetings of the Advisory Committee is that the role the social sciences is not just one more item in a long list of inadequacies; it is not just one more input.

The social sciences have to do with the human element that pervades this whole input matrix. They have to do on the one hand with understanding human behavior and the prediction of responses, and on the other hand, with understanding the functioning of institutions and organizations. Such understanding is necessary at macro or social level where policies are formulated and implemented. It takes highly trained people and a great deal of information to analyze and predict the level and distribution of costs and benefits of major policy alternatives. It takes also highly trained people to analyze and anticipate the "unintended consequences" of the social changes which accompany economic development. Economic hardship and social tension are the usual consequences of ill-conceived or poorly executed policies. The role of agricultural economics and other rural social sciences is equally obvious at the level of the farmer or the rural family. The social sciences provide the framework from which the farmer is approached. If his interests, motivations and values are not understood and taken into account, it will be difficult to induce him to change and improve his methods of farming.

There is no need to belabor the issue, which is in one sense simple and in another very complex. It is simple to develop convincing general arguments that the kind of specialized knowledge which rural social scientists have is very important for the tasks facing African agriculture. On the other hand, it is very difficult to specify what kind and how much of this knowledge is needed. Because of its broad impact, its specific contribution is very difficult to measure.

3.0. The Shortage of Rural Social Scientists in Africa.

The difficulty of measuring the contributions of social scientists does not mean that shortfalls cannot be observed. In addressing this issue, the Advisory Committee meetings in both East and West Africa put much stress on the fact that numerical shortages are only an aspect of the problem. The following dimensions should be looked at:

(1) Utilization: how are the available indigenous social scientists, the available facilities, and the available knowledge utilized by decision makers?

(2) Quality: there are two aspects to this dimension: the first deals with the level of training and personal qualifications, and the second deals with the relevance and quality of training and research.
(3) Quantity: this refers to the overall total as well as to the numbers trained and needed in specific fields.

The country surveys indicate that the issue of utilization is indeed a very important one, but that there is both underutilization and in a sense overutilization. The main forms of underutilization of available manpower and knowledge result from prevailing attitudes and from institutional arrangements. Perhaps the most widespread kind of underutilization is the result of the lack of interaction between governmental decision makers and social scientists in educational and research institutions. This lack of interaction is especially pronounced in Francophone countries, but it is also a problem in countries like Zimbabwe and the Sudan. The problem in the Francophone countries is part the tradition which sharply separates the academic and governmental spheres of activity. Even though higher educational institutions are the source of governmental professional staff, academic training and research are not treated as relevant to governmental operations.

Another form of underutilization concerns the exclusion of trained nationals from certain kinds of professional involvement by having recourse to expatriate professionals. It is a very widespread practice all over Africa to use external consultants for project preparation and analysis. The dominance of expatriate experts in these activities has been used as evidence of a shortage of trained national manpower. The investigator was told many times that recourse to external experts often disregards the availability of local professionals. African governments are often under pressure to use external experts when external financing is involved. In some countries, as in the Ivory Coast, the close link between expatriate advisors and foreign consulting firms tends to exclude nationals from important studies or projects. Such patterns were established when there was a much greater shortage of trained nationals. The situation will no doubt change as the number of qualified nationals increases. The reliance on nationals in Tunisia and to a considerable extent in Nigeria points in that direction.

A different kind of underutilization of local resources involves the training side. In a number of countries, such as Kenya, Tanzania and the Sudan, the government sends people abroad to be trained at the master's level when local facilities are adequate and underutilized. The consequence is not only underutilization but also a weakening of local training programs. Sometimes the foreign training is a result of the terms of foreign aid programs, but very often ministries favor the practice. For them, the promise of training abroad is often a major recruitment incentive for young staff.

Underutilization always involves some failure to appreciate the value of available resources or an inability to use them because of structural or organizational problems. Where governments have discovered the value of university social scientists, there is the opposite tendency, toward "overutilization". In Kenya and Tanzania, and perhaps also in some cases in Nigeria, there is a tendency toward excessive use of university and research institution staff as consultants for governments, international agencies and private organizations. Consulting can be and ought to be beneficial for all parties concerned. It serves a useful social function

while injecting at the same time relevance and realism into teaching and research. It is the kind of fruitful interaction between the university, government and the community which is lacking in so many countries. It becomes harmful, however, when it becomes excessive, when it is carried on to the point where it interfers which the primary functions of higher education, which are teaching and the development of new knowledge. Much consulting is directed toward short-run problem solving. Too much of this kind of consulting, though lucrative for the practitioners, detracts from the search for new knowledge, where the rewards are much less certain. Young African scholars who acquire a "consulting mentality" and a hunger for its rewards early in their carreers are not likely to contribute to the development of an autonomous and selfsustaining social science in Africa. Excessive consulting also may rob students of time professors should devote to them. In the end, what is called "overutilization" here is simply a question of which use of professional time is socially more important. The problem will persist so long as there is a shortage of trained people.

With regard to shortages in the number of people trained in both general and agricultural economics, there was ample evidence in every country visited. The simplest kind of evidence is the number of vacant posts and the number of expatriates employed in governments, universities and research institutions. Aside from the number of vacant posts and the number of expatriates employed, an important manifestation of manpower shortage is a high rate of turnover of professional staff. Governments and universities suffer the most from this problem. They provide the best advanced training opportunities and are most successful in recruiting young staff. Once the staff are trained, they take jobs with parastatal organizations or the private sector. This makes it extremely difficult for ministries,and to a lesser extent universities, to build up highly qualified and experienced professional staffs. The problem of quality shortage in the end is then primarily one of quantity shortage. In any country it takes a large number of trained people to end up with a handful of exceptionally qualified candidates. African governments will not be able to solve the quality problem of their professional staff until the quantity problem is solved.

Another aspect of the quality problem relates to the drain to international institutions, and in the case of the Sudan, to the wealthy Arabic speaking countries. In all African countries some of the most highly qualified social scientists have taken positions with international or foreign organizations. The desirability of this practice is not an issue. It simply must be recognized that representation in international organizations is part of the manpower pipeline which must be filled.

In the reports on individual countries figures are given which were obtained from ministries and universities about vacant positions in economic and agricultural economics. One might be tempted to add up these figures to get some global estimate of shortages, but that would not be a very useful exercise. In many countries the real need is much greater than the observed shortage. The real shortage should be measured against the number of people a ministry should have to carry out the tasks for which it has responsibility. In most countries, the professional positions in ministries are more indicative of the country's resources, including available trained manpower, than of the tasks confronting the ministries. The lack of a strong demand for agricultural economists by the Zimbabwe, the Upper Volta, or the Ivory Coast Governments is a reflection of internal organization rather than an indication of having met basic needs. This

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observation applies particularly to the almost complete absence of any overt demand by governments for rural sociologists, anthropologists, and geographers. African governments are for the most part not yet set up to tackle the problems where they feel the need to employ the skills of these specialists.

African governments have not yet seriously undertaken the transformation of peasant agriculture. There is in fact a serious shortage of base line information and analysis of rural social structures throughout Africa. Until this fact is fully appreciated by governmental decision makers, the underlying shortage of rural sociologists, anthropologists, and geographers will not become apparent.

The question of a shortage of the right kind of training and the right kind of research relates to disciplines as well as to subjects. A frequent complaint by ministries, especially in countries where there is little contact between them and higher education, is that the training is too theoretical and too removed from the realities of the country. There is a great deal of justification to this complaint. Most African social science faculties are still very young. The teaching staffs are either not yet fully Africanized or only a few years removed from their graduate training abroad. In many countries, curricula, courses and course contents are replicas of patterns taken over from either French or Anglo-American universities. Teaching materials are often imported from the same countries. In spite of some laudable educational efforts, there are not yet enough of what the Advisory Committee in Nairobi called "deviant cases". In agricultural economics the dominant analytical models are almost everywhere based on the profit maximizing large-scale farmer. In illustrations and examinations the names are changed from Iowa to Africa, but the behavioral rationale and the environmental and institutional constraints are assumed to be more or less the same. In this respect, the faculties of agriculture generally lag behind the practitioners of the multidisciplinary farming system research approach to peasant farming.

.0. The Need for a New Approach.

The question must be raised now whether exisiting efforts to develop and utilize the rural social sciences in Africa are all one can expect, or whether additional efforts or a new approach are called for? There are essentially three arguments one can make in favor of greater efforts or a new approach to training and research. One is that the critical situation facing African agriculture, especially in food production, calls for increased efforts in the rural social sciences in order to provide greater support for work undertaken in the agricultural sciences. The second argument is that the development of the rural social sciences in Africa to date has not given them the stature they need to have in order to be of effective service in African agricultural and rural development. Third, there are many unfilled training and research needs left which run the risk of not being met for a very long time under the project oriented approach which has generally prevailed until now. Many projects have run their course and donors have withdrawn or shifted to other concerns, but many needs remain. There are vast differences between African countries in their development and utilization of the rural social sciences. There are opportunities to strengthen all countries through intellectual interaction and sharing of research and training experience. Knowledge is a "public good", which means that it can be consumed simultaneously by many people without depriving any one else. It is necessary to devise an approach

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which raises not only the potential performance of the rural social sciences, but also their acceptance and their stature, and at the same time spreads the benefits to as many countries as possible. It must also be an approach which reinforces rather than duplicates existing training and research efforts and which has long term effects. It must look at the problems of the rural social sciences in Africa as a whole and over a long horizon. And last but not least, it must be sensitive to the real needs of the African countries.

Chapter 2

Recommendations

1.0. Strategy.

An overall strategy for enhancing the contribution of the rural social sciences to African development must have two major objectives. The first is to strengthen the links between the rural social sciences and the development process in all African countries. Such a strengthening implies an increased understanding and awareness of the potential contributions of these disciplines to the solution of critical development problems. Awareness and understanding have to be increased within the academic establishment but even more importantly among those responsible for the formulation and execution of agricultural and rural development policy. An enhanced understanding should lead to more effective utilization of both manpower and research in rural social sciences by all affected public and private agencies. It should educate these agencies to expect and to demand effective support from the teaching and research establishment.

The second objective has to be enhancement of the qualitative and quantitative performance capacity of both training and research in the rural social sciences This implies stronger teaching staff, stronger and more relevant programs, more emphasis on problem oriented research and more responsiveness to the needs of utilizers.

2.0. Program.

It is easier to state the objectives than to devise the methods and specify the means of implementation. The following are essentially suggestions on how one may proceed, but there are no doubt other ways that should be considered.

To achieve the objectives outlined above requires a Continent wide effort over a long period of time. The planning horizon should be no less then twenty years. A Continent wide effort may be achieved through joint activities, sharing of resources and results, and the development of active links between training and research in different countries. These objectives do not require the creation of new institutions but can be achieved through the strenthening of existing institutions.

Four kinds of inputs or activities are required to carry out this Continent wide effort.

(1) The first is the creation of an international team of visiting rural social science scholars. This team would be the nucleus of a continental network. Since the objective is to inject more resources into Africa, the initial composition of the team would be in majority non-African. But to build an African network and strengthen exchanges among African countries the team should have African members from the start, and its expansion over time should be on the basis of African scholars. It should consist of teacher/researchers with initial emphasis on those specialities which are most needed for the transformation of traditional African agriculture. The greatest initial need is for farming systems oriented agricultural economists.

(2) The second input is funds to strengthen the manpower of teaching and research institutions and of the links between them. The funds should provide for overseas fellowship for study at the doctorate level. In countries where the needs for such fellowships are already met, the funds should serve as post-doctoral fellowships to enable young African scholars to do post-doctoral studies or research in other African countries or overseas. To strengthen the network concept, post-doctoral fellowships should enable the holders to become familiar with and contribute to the work of African institutions other than their own.

(3) The third input is funds to strengthen teaching and research programs. This should be done in two ways. First, the funds should assist in the preparation and dissemination of teaching materials and in the publication and dissemination of research results. Second, the funds should provide fellowships for post-graduate training to the master's level within Africa. These fellowships would strengthen the teaching program as well as help relieve the shortages of people with advanced training in governments.

(4) The fourth input is funds to organize seminars, workshops, and in service training at the regional and country levels. The workshops would bring together international and national rural social scientists and government officials with responsibility for policy design or implementattion. The aim would be the improvement of the relevance and utilization of the social sciences through a form of mutual education of teachers, researchers, and officials. The funds for in-service training would be for the collection and preparation of teaching materials relevant to the problems facing the agency that needs the training. It is assumed that the agency for whom the training is done would bear the other costs and that the funds would serve mainly as a stimulus to initiate the programs.

The next set of issues to be dealt with is the organization of these activities, bearing in mind that the structure should remain simple and wherever possible should work through existing institutions. Some international secretariat is needed, however, to handle the overall management: the raising and disbursing of funds, the recruitment and appointment of the visiting scholars, and the agreements with host countries and institutions.

The other activities, such as the selection of fellowship candidates, the organization of workshops, assistance to the preparation of teaching materials, should be managed at the regional level. To build up the kind of network envisaged here, it would seem most feasible to concentrate in the beginning on those countries where there is the greatest training and research strength. These countries would serve initially as location for the regional cells of the network. The visiting scholars would be appointed to a teaching or research institution in these countries. They should preferably be appointed to a teaching institution but attached to a research program. The regional program would be directed by a committee which would have as its members the visiting scholar or scholars, other prominent scholars from the region and governmental representatives. The committee would be the decision making body, but its members would also have the responsibility for organizing activities within the region.

The teaching institutions where the visiting scholars are appointed are the initial institutions to be strengthened. They serve as regional centers for training to the master's level in agricultural economics. The number of regional centers that can be created depends on the funds available for visiting scholars, doctoral and post-doctoral fellowships and master's fellowships.

At this time there are at least eigh countries with institutions that could be strengthened to serve as regional teaching centers. The countries are, in alphabetical order: Cameroon, Ivory Coast, Kenya, Nigeria, Sudan, Tanzania, Tunisia and Zimbabwe.

If one were to start with five visiting scholars and tried to obtain regional distribution, one might select the following countries and institutions:

(1) For Southern Africa	- the Faculty of Agriculture of the University of Zimbabwe
(2) For Eastern Africa	- the Faculty of Agriculture of the University of Khartoum
(3) For Anglophone West Africa	- the Faculty of Agriculture of Ahmadu Bello University
(4) For Francophone West Africa	- a joint appointment between ENSA and CIRES at Abidjan
(5) For North Africa	- a joint appointment between INAT and INRAT at Tunis

In order not to foster the separation between Anglophone and Francophone Africa, the ENSA of the Cameroon should be included as soon as possible as a regional center with bilingual training. There are existing local plans for the strengthening of the Cameroon ENSA as well as the Ivory Coast ENSA. In Nigeria, the Faculty of Agriculture at Ibadan serves already as a regional training center. Its Department of Agricultural economics is very strong and may be a source for visiting professors.

Part II

COUNTRY REPORTS

Chapter 3

CAMEROON

1.0. Overview.

Agriculture provides employment for 73% of the labour force; it generates 30% of gross domestic product at factor cost, 70% of foreign exchange, and from 30 to 40% of governmental revenue. In spite of this importance, which is formally acknowledged in each of last five-year national development plans, agriculture has not been allocated a share of investment commensurate with its contribution. Over the last 20 years, investment in agriculture has averaged 14.4% of national investment expenditures, or slightly less than half of agriculture's contribution to gross domestic product. Over this same period of time, there has been a decrease of private investment, which has only in recent years been counteracted by an increase in public investment. In addition to becoming less attractive to private capital, the agricultural sector is less and less attractive to the labour force.

The most mobile and the most energetic elements of the rural labour force, namely the young, have been leaving agriculture for more promising earning opportunities in other industries and more attractive living conditions in urban settings. The result is an aging of the rural population and a loss of dynamism and adaptability in the agricultural sector. In 1976, the rural areas had 70% of the total population, but 80% of the population between the ages of 40 and 60. About 43% of the country's acreage under cultivation is cultivated by farmers who are over 45 years of age.

A document published by the Ministry of agriculture (Bilan Diagnostic du Secteur Agricole de 1960 à 1980, March 1980) stresses the urgent need for the state to take measures to counteract these tendencies. Among the recommended measures are higher producer prices, development of rural amenities and infrastructure, and appropriate material and technical assistance to peasant cultivators. The traditional sector so far has received the least attention. Its low productivity and purchasing power have been decreasing over the last 20 years. Nevertheless, this sector produces the bulk of the agricultural output and employs 950,000 peasant households, about 2,200,000 persons. Another part of the peasant sector, which employs 100,000 households is referred to as the "secteur encadré". This sector either receives support from parastatal organizations (sociétés de développement) in the case of certain cash crops, such as cocoa or cotton (SODECAO, SODECOTON), or has benefitted from regional integrated development projects (ZAPI-est, HAUTS PLATEAUX de l'OUEST). Together both peasant sectors produce 90% of the agricultural output and received 40% of the investment budget. Most of this support has gone into the 10% of the peasant sector which is the "secteur encadré", with rather mixed results. The modern agricultural sector, both public and private, has absorbed 60% of the investments but produces only 10% of the value of output.

The government of Cameroon has used many different approaches to the promotion of agricultural output, ranging from state owned agro-industrial complexes, "guided" peasant production, to simple provisionof subsidized pest control and fertilizers. The results of these approaches have been very mixed, and at this time the data are not available to make comparisons of cost effectiveness between the high cost complexes and the simple subsidies to peasant farming. The lack of data and relevant analysis are a manifestation of the

shortage of manpower both in traditional agricultural research as well as in agricultural economics and other rural social sciences. Although the shortage of high level manpower is only one of the retarding factors of Cameroon agriculture, it has a crucial impact on policy analysis, project formulation and execution, as well as on the development and delivery of appropriate technical assistance packages.

Cameroon is fortunate in that the country still has large reserves of unused or underutilized arable land. According to the Ministry of Agriculture, even on the basis of traditional agriculture, agricultural employment could be trippled without running into a land shortage. The promotion and transformation of traditional agriculture is important not only to counteract the long-term tendencies toward agricultural decline, but also te relieve the growing pressure of unemployment in the cities. The creation of a job in agriculture takes only a fraction of the capital required to create a job in the modern sector.

2.0. Demand for and Utilization of Rural Social Scientists.

The planning process in Cameroon involves inputs from the operating ministries, which often have only embryonic planning units, and from various levels of regional government. The agency which does the technical analysis and prepares the national plan is the Planning Directorate (Direction du Plan) of the Ministry of Economy and Planning. This one of six directorates, the others being Programming, Industry, Commerce, Prices Weights and Measures, Statistics, and National Accounting. The Planning Directorate is considered the analytical unit (cellule de réflection) of the Ministry. It is expected to prepare background studies, develop policy strategies, conceive and analyze projects, and combine all the various parts of the plan into a coherent and consistent whole. To carry out all of these tasks, the Planning Directorate has a small and for the most part not highly trained staff. It is headed by a director who has a Ph.D. in socio-economics. Under him are around 30 Cameroonians with university degrees and 2 expatriate experts. Only one or two of the Cameroonians have been trained to the master's level, although a number of them have a one-year post-graduate diploma (Diplôme des Etudes Supérieures). Most of them have degrees in economics except for 3 persons trained in statistics, 2 in demography, 1 in human resources, and 1 in political science.

The Director indicated that to do all the work that ought to be done, the Ministry could use about "10 times" the number of professionals it has. There is also a problem of lack of experience and specialized training for sectoral analysis. Most of the staff are young and short on experience. There is considerable turnover, especially in favor of the parastatal organizations. The Director noted that although turnover is a problem, it has the advantage fo building bridges with other organizations who participate in the planning process.

The present staff of the Planning Directorate does not seem to be able to cope with more than routine planning functions, such as project evaluation and assembling the elements of the plan submitted to them. Judging from the content of the current plan, not much analytical work is done. The Directorate relies on outside assistance for the preparation of studies and projects.

A semi-public consulting firm, the Société d'Etudes pour le Développement de l'Afrique (Seda) was mentioned as a major contibutor. Important projects are often done by international agencies, especially when they are financed by external assistance. There is no question that the Directorate of Planning suffers from a serious qualitative and quantitative manpower shortage.

2.2. The Ministry of Agriculture.

At the national level the Ministry of Agriculture is divided into eight Directorates. The Directorate which is most relevant for planning and policy analysis is the Directorate of Studies and Projects (Direction des Etudes et Projects). The other Directorates are: Agriculture, Water and Forests and Wild Life, Cooperation and Mutuality, Agricultural Education, General Administration, Rural Engineering, and Community Development. The Directorate of Studies and Projects is in turn divided into four divisions: Studies and Projects, Statistics, Agricultural Economic Surveys, and Administration. Overall the Directorate of Studies and Projects is responsible for:

- Studies of a general nature in cooperation with the office in charge of agricultural research and the office responsible for overall economic planning.
- Giving the government advice on the objectives and means of agricultural policy
- Designing, evaluating and programming agricultural activities
- Recommending government intervention in the agricultural sector
- Defining sector programs by commodity
- Planning rural development, and
- Identifying, preparing, and monitoring agro-industrial projects

These are very complex tasks which require highly qualified and experienced personnel. In addition to this basic conceptualization and analytical work the Directorate has the task of supervising projects carried out by 21 parastatal bodies in the agricultural sector.

At this time the Directorate of Studies and Projects does not have any Cameroonian staff with post-graduate degrees. The Cameroonian professional staff consists of around 20 ingénieurs agronomes plus one person with a straight B.A. economics degree, one person holding a B.A. in sociology, one graduate in information/communications and two graduates in statistics. Most of these Cameroonians are young and inexperienced. One of the staff members of the Directorate estimated that on the average they have been out of the University only about two years. This year, the Directorate intends to recruit ten more Cameroonians, which will lower further the length of average experience. The reason for the low level of experience is partly a reflection of the fact that the Directorate itself is only five years old. It was created following a decree of July 1976 wich reorganized the Ministry of Agriculture. The Directorate is the successor to the former division of Rural Development which had a narrower mandate. In part the low level of experience is also the result of turnover. The Directorate is considered an excellent stepping stone for positions in the agricultural parastatal corporations, which offer more attractive terms of employment. The Directorate, as someone pointed out, plays the role of training ground for the parastatals.

It is estimated that it takes at least five years on the job supplemented with a good program of in-service training for an ingénieur-agronome to become reasonably proficient at the kind of work the Directorate has to do. For the time being most of the energy of the Cameroonian staff is consumed trying to keep the dossiers of the parastatals up to date. The analytical, planning, and statistical work is done by a group of expatriates furnished by the World Bank, the French, United States, and Canadian governments. As part of their role, these experts are supposed to do on-the-job-training of counterparts, but often lack of counterparts and pressure of time limit this aspect of training.

The Directorate is very conscious of training needs and has initiated a three-part training program for the Cameroonian professional staff. The first part consists of a series of four three-week seminars spread over one year. these seminars focus on sectoral planning and are taught by staff members from the Pan African Institute for Development in Douala. The second part of the training program focusses on projects which are part of the regular work of the Directorate. The trainees are assigned a project on which they work under the guidance of a senior staff member. These projects are worked on in-between the seminars and serve as a basis for seminar discussions. The third part of the program has just begun and consists of basic courses in micro and macro-economics with an eye toward application to the tasks of the Directorate. The course is taught for four hours on Saturday mornings by a professor from the University of Yaoundé. Its objective is to overcome the trainees' shortcomings in basic economic analysis and in their ability to apply analysis to concrete cases. The Ministry is rather critical of the level of analytical competence obtained by students in their regular academic program. The argument was heard that regular university training is "too theoretical", but at the same time the students are "not very good at conceptualizing and abstract reasoning." The special Saturday course was designed to the specifications of the Ministry, apparently with considerable difficulty.

The ministry of agriculture, like most other governmental agencies, has almost no institutional contact with the University. The general attitude is that University people cannot think in terms of the problems faced by a ministry. University people are said to have a critical rather than a problem solving attitude. They are prone to criticize the political decisions underlying a project instead of restricting themselves to more or less technical analysis and evaluation. The Directorate of Studies and Projects does not rely much on outside studies. except where the bio-physical sciences are involved. For that the agricultural research institutes are called upon. It is mainly when large externally financed projects are involved that foreign consultants are used.

The Directorate of Agricultural Education of the Ministry of Agriculture is responsible for agricultural training below the level of a University degree. This responsibility includes:

- the development and application of agricultural training policy
- the development and application of policy on in-service training (perfectionnement et recyclage) for staff of the Ministry of Agriculture, both in Cameroon and abroad
- technical and pedagogical supervision of all public and private agricultural schools (except university level which is under the ministry of Education)

- Development and application of policy on the settling of young farmers
- research and utilization of agricultural documentation
- handling of all agricultural fellowships

At this time there are very few in-service training programs in the Ministry of Agriculture, although the Directorate of Agricultural Education feels that such programs are the Ministry's greatest training need. Altogether there are eleven middle level schools under the control of this Directorate, including:

(1) the Collège Régional d'Agriculture at Bambili

which turns out 25 "techniciens d'Agriculture" and 25 "Agents techniques d'Agriculture" per year. These are diploma level agents used at the provincial, departmental, and subdepartmental levels.

(2) four Ecoles Techniques d'Agriculture (ETA)

two of them, the one at Maroua and the one at Ebolowa are in the process of being transformed into Collèges Régionaux with assistance from the World Bank. The ETA's train people at the "agent technique d'Agriculture level".

(3) the Ecole des Eaux et Forêts at Mbalmayo

(4) two Centres Nationaux de Formation Coopérative for cooperative agents

(5) two Centres Nationaux de Formation en Développement Communautaire

to train people in community development

(6) and one school at Garoua to train people in wildlife management

When the three colleges régionaux will be functioning, they will turn out 135 "technicians" and 180 lower level "agents techniques" per year. The remaining ETA's will add another 20 "technicians" and 40 "agents techniques' This represents a very substantial increase over past production, since from 1960 to 1975 only 533 "technicians" and 577 "agents techniques" were turned out. It is a reflection of the government's concern for a more dense "encadrement" of agricultural development.

3.0. Training and Research in the Rural Social Sciences.

3.1. The University of Yaoundé.

This is the main establishment of higher education in Cameroon. Training relevant to agricultural and rural planning takes place in the departments of Economics, Geography and Sociology. The Department of Economics is located in the Faculty of Law and Economics. It is the largest department in the University in terms of students. The University was originally designed for 3000 students, but the current enrolment has risen to around 10,000. Out of these 10,000 , some 2600 are enrolled in economics. The reason for this large enrolment is the relative ease with which graduates can find jobs, both in the private sector and in government. Most of them find jobs in the private sector. To handle this large number of students the Department has a permanent staff of only 20 persons, a staff student ratio of 1:130. The Department hires part-time people to handle discussion sections. A course normally has two hour lectures per week and one hour of discussion.

The normal teaching load for staff members depends on rank: 6 hours/week for Professors; 7 hours/week for Maîtres de Conférences; 8 hours for Chargés de Cours; and 10 hours for Assistants. Because of the staff shortage, most people teach supplementary hours, for which they get paid extra. Any staff member can teach up to 350 hours during the 25 week academic year. A maximum load would thus mean 14 hours of teaching per week, not counting work in supervising papers and projects. This arrangement increases the income of the teaching staff, especially at the senior level, but it leaves very little time for a meaningful research program, except during the summer months. During the summer months people who are still climbing up the promotion ladder try to get some research done. Research and publication is a requirement for promotion, although as usual, the amount required is hard to define. The people in the most difficult position are the "Assitants" (instructors) and others who are still working on a doctorate. They cannot get promoted to the "Chargé de Cours" (assistant professor) level until they finish their doctoral dissertation, which is very hard under the prevailing circumstances. Not only is there pressure of heavy teaching loads, but there is almost no research support. The university's library is worthless as a research resource. Hardly any books have been added in years, and whatever journals are being received are hard to find because they are not properly catalogued and shelved.

Research depends heavily on field work, but there is very little money available to support field research. Instructors working on dissertations mostly finance their research out of their own pockets. All in all, there is little incentive to do more than a bare minimum of research. The morale of the staff is rather low. They feel trapped in a vicious circle in relation to government users of research. Staff members feel that they are not given the means and opportunities to do research, and because they cannot establish their credibility, they are dismissed by ministries as a research resource. Apart from a few individuals, there is very little call upon University staff for contract research or consulting. In any case, most of the staff of the Economics Department are in junior ranks. Of the 20 staff members, there are two professors, six Chargés de Cours (assistant professors) and twelve Assistants (instructors).

The undergraduate program in economics consisted of four years of course work until 1979. In that year a new program was introduced under which the Licence is obtained in three years. The fourth year leads to a Maîtrise, which is a post-graduate diploma between a B.A. and an M.A. degree. Under the old system, all students took the same courses during the first two years. During the third and fourth year, one-third of the courses were common to all students, and two-thirds were selected from either "economics of the public sector" or "business economics" (including finance, accounting and managerial economics"). Under the new program all courses are common for the three years of the Licence, but for the Maîtrise the students specialize in either public sector or business economics. Whereas before, all students would follow the four-year program, now there is a new selection at the end of three years. It is anticipated that only about one-half of those obtaining the Licence will be allowed to go on to the Maîtrise.

The training programs at Yaoundé basically follow the traditional French pattern and are class-room oriented, with little time for individual study. The students spend 24 hours each week in lectures and "travaux dirigés". About two-thirds of this time is spent attending lectures with several hundred students in big halls. The discussion sections involve from 20 to 40 students. On paper, at least, the program makes some minor concessions to the national context. It includes one course each in agricultural economi((économie rurale), sociology of the Cameroon, and demography.

As indicated earlier, the economics Department has a very large enrolment. During 1980/81 the undergraduate enrolments in economics were as follows:

1st year class	800
2nd " "	603
3rd " "	665
4th " "	519
total	2587

Since the new program started in 1979/80, it will be the second year class of 1980/81 that will furnish the candidates for the Maîtrises in 1982/83. It is expecte: that between 250 and 300 of the 603 now in the second year will be accepted for the Maîtrise. At the graduate level the Department of Econonomics has around 40 students preparing a Doctorat de 3e Cycle, which consists primarily of a dissertation and takes a minimum of two years after the Maîtrise. There were no students preparing the Doctorat d'Etat, which takes a minimum of four years beyond the Maîtrise.

The departments of Geography and Sociology are in the Faculty of Letters and Human Sciences. Rural development is one of the areas of emphasis in the Department of Geography, which is generally more oriented toward human rather than physical geography. Two of the fifteen staff members of this department teach and do research in rural development. On the whole the Department of Geography has a young staff. There is no one at the rank of professor, only one associate professor (Maître de conference), eight assistant professors and six instructors. Only ten of the fifteen staff members are nationals. During 1979/80 the Department had 54 students enrolled in the final (3rd) year of the Licence, 20 preparing the Maîtrise, one preparing a master's degree, and 14 preparing the Doctorat de 3e Cycle. Geography does not offer very good prospects for employment. The Ministry of Agriculture, for instance, rarely hires geography students, although they have skills which could be useful.

The sociology department has primarily an urban orientation, which includes the rural influx into the cities. It is a small Department combining sociology and philosphy, which reflects a rather dated conception of sociology as an field of inquiry. In 1980/81 the Department had a staff of seven persons, including four non-Cameroonians. The third-year enrolment was 26 students. There were eleven students preparing the Maîtrise and six preparing the Doctorat de 3e Cycle. Although the teaching loads in Geography and Sociology are not nearly so heavy as those in Economics, there does not seem to be a great deal of research done. Nevertheless, the Dean noted in his annual report that research is "a major obligation" of University staff. It determines "promotion to higher grades, the granting of the annual prime de recherche, receipt of invitations to international conferences and as Visiting Professors, and finally, recognition and integration into the scientific world."

Other people pointed out that the prime de recherche (research bonus) is very small and uncertain and that lack of an adequate library and other support facilities were a major handicap. In addition, many people in the social sciences seek to supplement their regular income through part-time secondment to other institutions and ministries. Apparently this practice has negative effects on the teaching program at the University. The Dean referred in his annual report to " ... frequent absences from the Faculty of some of our colleagues on secondment." He noted that " ... secondment constitutes a massive brain drain and a major dislocation of the teaching program of the Faculty."

3.2. The Ecole Nationale Supérieure Agronomique (ENSA)

Agricultural economics and rural sociology in the Cameroon are taught primarily at the ENSA, which has two campuses, one at N'Kolbisson, near Yaoundé, and one at Dschang, 400 km away. The centre at Dschang is still under construction although some courses are being offered there. Within five years Dschang will become an agricultural university, with major assistance from USAID, which is envisaging a $45 million assistance program (not yet approved). The ENSA program takes five years, at the end of which the students are awarded the degree of ingénieur agronome. During the first three years all ENSA students take the same courses, which include general economics, introduction to agricultural economics, farm management, and land legislation. From the fourth year on, the students are divided into two tracks: forestry and agronomy. During the fourth year the agronomy track includes two economics courses, one in "marketing credit, and cooperatives", and one in "theories of economic development and rural planning". During the fifth year the agronomy students specialize in one of three areas: (1) plant production, (2) animal production, or (3) agricultural economics and extension. Those who specialize in agricultural economics take courses in project analysis, research methodology, applied statistics, marketing, economic development, and optimization. The program appears to be designed to expose students to a number of areas, but it is not likely to give them a solid foundation in applied economic analysis, either at the macro or the micro level. Indeed, the exam questions posed to students in the fifth year marketing course did not seem to be very searching.

The ENSA at N'Kolbisson has an annual intake of around 50 students and turns out about 40 ingénieurs agronomes. Among those 40 an average of 8 to 10 specialize during their fifth year in agricultural economics. The economics staff at ENSA consists of two full time and five part-time staff. In addition there is one staff member located at Dschang and one getting his Ph.D. in the U.S. Including the staff member at Dschang, three of the full-time members have Ph.D.'s. The staff is very young. The head of the department received his Ph.D. at the University of Illinois in 1978. At this time none of them seems to have much time for research, mainly because of their teaching at several institutions and because of lack of research resources.
The head of the department teaches both at N'Kolbisson and at Dschang, in addition to his administrative duties. He is very much concerned that the demands of course preparation, teaching, grading and supervising the fifth year projects of the students, leave no time for the staff to develop themselves professionally. They cannot keep up with developments in their fields and tend to become isolated from the profession at large. They train students who mostly go to work for the Ministry of Agriculture, but they have no interaction with the Ministry. They do not even interact much personally with their former students. There is a kind of a wall between the Ministry and the school. The people at the school feel that the Ministry is afraid of criticism.

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Some staff members indicated that they offered to work on Ministry projects without compensation, but their offers were not accepted. The Ministry of Agriculture is critical of the economics training given at the school, but there is no specific feed-back. The situation is complicated by the fact that the school is under the Ministry of Higher education, which is the formal channel for links with governmental agencies.

The total number of people trained in agriculture in the Cameroon is still rather small. From 1965 to 1980, only 338 ingénieurs agronomes have been turned out. This probably means some 60 to 80 persons with a "specialization" in agricultural economics and extension at the university level. Below the level of a university degree some 600 Techniciens de l'Agriculture and about 600 Agents Techniques d'Agriculture were trained over the same period. Both of these titles involve post secondary school training.

3.3. The Institut des Sciences Humaines

The research establishment in the social sciences outside of the University is still in an embryonic state, although it has been recently reorganized. The former Office National de la Recherche Scientifique et Technique (ONAREST) has become the Délégation Générale de la Recherche Scientifique et Technique (D.G.R.S.T.) and placed directly under the Prime Minister's Office. Within the DGRST there is an Institut des Sciences Humaines which has four centers: (1) the Centre de Recherches Economiques et Démographiques, (CRED), (2) the Centre de Recherches en Sciences Sociales (CRESS), (3) the Centre de Recherches en Anthropologie (CREA), and (4) the Centre Géographique National (CGN).

Within the CRED there is a program in rural economy research. It is a USAID supported Social Science Research and Training Project under a contract with the Fletcher School/Tuffs University of the USA. The goal of this project is "to strenghten the Cameroon Government's capacity to plan and evaluate rural development programs. The principal objectives of the project are: (1) to support the development of a socio-economic research centre with the program priorities and professional credibility to contribute to Cameroon's development and (2) to collect, analyse and disseminate socio-economic data for rural development programs in North Cameroon." The Fletcher School provides a senior researcher for two years in addition to short-term consultants and six U.S. graduate students for 15 months each.

At the time of the visit, the CRED had a Cameroonian staff of seven, including two Ph.D.'s, three with a post-graduate diploma, one ingénieur agronome and one with only a Licence. All of the five below the Ph.D. are working toward a master's degree. In addition, there are two Cameroonians at the Fletcher School preparing an M.A. in economics. The CRED has developed its rural economy project in close consultation with the Ministry of Agriculture, but at the initiative of the CRED. The Ministry used this as an illustration that it is willing to cooperate with University sponsored projects, although ironically in this case it is a foreign rather than the national university. The CRED program has also maintained close contact with the Institut de Recherches Agronomiques (IRA). At the moment IRA does not do any social science research, but it is about to undertake a project with IITA dealing with farming systems research and related extension work.

4.0. Concluding Remarks.

The Cameroon government suffers from severe manpower shortages but it is structured to make potentially good use of well-trained rural social scientists. There is underutilization of manpower outside of government, since there are still important barriers to the interaction of social scientists and policy makers. Significant improvements in the quality of agricultural economics have a fair chance of resulting in improved governmental policies and programs. Stronger rural social science programs as well as improved interactions between planners and policy makers on the one hand, and the teaching and research establishment on the other hand, is greatly needed. Some of the existing and planned programs are moving the country in that direction.

Chapter 4

I V O R Y C O A S T

1.0. Overview.

Since independence the government of the Ivory Coast has based its development program on the growth and diversification of agricultural production. This approach has been quite successful, and it has turned agriculture into the driving sector of the economy. However, the very success of this approach has led to a serious regional imbalance in terms of income distribution and development. As in a number of other African countries, the major focus of the government's agricultural policy has been on the development of export crops, which produce both governmental revenue and foreign exchange. There has been relatively little emphasis on the development of food crops. The export crops have received three-fourths of governmental investment in agriculture.

The government's approach has been to establish special parastatal organizations (Sociétés de Développement) whose function it is to provide technical assistance and material inputs to the agricultural sector, which consists mainly of smallholders. This approach has been used with considerable success, although at high cost, for the production of export crops. Only one parastatal, for the production of rice, was established for a food crop, and it was abandoned in the wake of mismanagement. The regional imbalance which has arisen as a result of the one-sided emphasis an export crops derives from the fact that all of the export crops - coffee, cocoa, rubber, palm products - with the exception of cotton are tree crops, which are grown primarily in the southern one-third of the country. This region has, therefore, been the main beneficiary of governmental policy. This policy can be readily defended in terms of maximizing the value of agricultural production, which has been a governmental objective. But there are other governmental objectives, namely balanced regional development and equitable income distribution, which are in conflict with the first objective. The economics of the conflict becomes evident when account is taken of the fact that the returns per man/day in the production of cocoa and coffee are 2,120 CFA and 1,180 CFA respectively, as against 300 CFA per man/day in growing maize.

An obvious solution seems to lie in the direction of increasing the labor productivity in the production of food crops, although it is doubtful that productivity in food production could be raised sufficiently to compete with coffee or cocoa. The Ivory Coast has a natural international comparative advantage in coffee and cocoa production, whereas the cost of Ivory Coast maize and cassava is 60 percent above the world market price. The cost of rice is twice, even three times, the world market price, when the cost of the "encadrement" by the former parastatal (SODERIZ) is taken into account.

Partly for the purpose of improving the regional income and development balance and partly to lessen the country's growing dependence on food imports, the government announced a new policy in 1977 which involved a major shift in orientation. The previous approach, under which there was a separate parastatal for the extension services of each major export crop, was to be replaced by a regional integrated approach to agricultural and rural development. To get away from the previous piece-meal approach,

several new divisions with planning and coordinating responsibilities, were created with the Ministry of Agriculture. The new divisions included the Direction de la Programmation, de la Budgetisation et du Control de Gestion (PPGCG), the Bureau d'Etudes Techniques des projects Agricoles (BETPA), and the Office National de la Promotion Rurale (ONPR).

Unfortunately, to this date these reforms have not yielded the hoped for results. The new Sociétés de Développment charged with the integrated development have not really implemented the reforms. Food production remains the recipient of marginal efforts, while emphasis continues to be placed on export crops. The major problem is not resistance of the parastatals to the reforms but the lack of good technical and ecologically appropriate packages for food production, whether integrated with export crops or otherwise. Other problems are poorly developed marketing channels for food crops and official pricing policies which are not consistent with an integrated development approach.

There are a number of requirements which must be met to make the new approach successful. First among them is an accelerated research program for the development of effective packages. There is also a need for new price policies which will favor an integrated development, a need for improved marketing channels, and a need for strengthening the extension service as well as the training of technical and rural development manpower. These changes will require increased investment allocations to the agricultural sector, which has been receiving 15 to 20% of investment funds while it produces 40% of GDP and provides 75% of national employment.

2.0. The Demand for and Utilization of Rural Social Scientists.

In spite of an apparent need for them, the rural social sciences, whether agricultural economics or rural sociology/anthropology, are not in high demand in the Ivory Coast.

2.1. The Ministry of Agriculture.

This Ministry and its related parastatals employ most of the ingénieurs agronomes who come out of the Ecole Nationale Supérieure d'Agriculture. Although about one-third of these ingénieurs agronomes have "specialized" in agricultural economics in their final year, the Ministry neither hires them nor necessarily employs them on the basis of this specialized training. All ingénieurs agronomes coming out of ENSA are automatically offered a governmental position. The Ministry of Agriculture has nine divisions, one of which is the Direction de la Planification, de la Budgetisation et du Control des Gestions, which one would assume would be staffed primarily with people trained in agricultural economics. However, this does not appear to be the case. The 60 to 70 Ivoirien ingénieurs agronomes in the Ministry of Agriculture are posted in various divisions according to vacancies, without any concentration of persons trained in agricultural economics in the division with planning responsibility. It was evident that rather little conceptual planning or policy analysis requiring economic training takes place in the various divisions of the Ministry. Their chief concern is day to day managerial and administrative tasks. The conceptual and analytical work is concentrated in the office of the Minister, who has a group of six expatriate conseillers techniques at his disposal. These conseillers techniques are not foreign aid personnel but direct contract hires by the Ivoirien government. As a rule, they are hired from French consulting firms, which typically provide back up support for larger projects or studies. In other words, when the Ministry

needs a background study or analysis of a project, it almost invariably calls on these French consulting firms. There is normally no effort to involve researchers from the University, or from national research institutes, or consultants from local firms.

2.2. The Bureau d'Etudes Techniques des Projets Agricoles (BETPA).

The main exception to the procedure described above applies to technical studies and project evaluations. For such work the Ministry of Agriculture uses BETPA which is under its jurisdiction. BETPA has a professional staff of some 50 people, all of them are ingénieurs agronomes, except for one geographer and two persons with training in agricultural economics. The work of BETPA and the terms of reference for the studies it carries out do normally not have economic or social dimensions. They are essentially of a technical nature. Among the 50 staff members of BETPA there are 15 expatriates.

2.3. Ministère du Plan et de l'Industrie.

A similar situation holds in the Ministry of Planning. This is a new Ministry, which was created when the former powerful Ministère de l'Economie, des Finances et du Plan gave up the planning division, which was then combined with the Ministry of Industry. In the free market economy of the Ivory Coast, planning does not have any directive functions. The plan document serves an indicative role and as an instrument of policy analysis. The new Ministère du Plan et de l'Industrie was formed only a few months ago and is still in an organizational phase.

The planning and policy analysis will be the responsibility of the Direction Générale de la Planification, which in turn has a central planning office (Direction du Plan) as well as sectoral and regional offices. The Direction du Plan has 12 professionals, including 9 economists. Among these 12, there are 8 expatriates and 4 Ivorians. In addition, there are three expatriate conseillers techniques attached directly to the office of the Minister. Almost all of the conceptual and analytical work done within the Ministry is done by expatriates. The preparation of larger projects and background studies is handled by external consulting firms.

This pattern explains the weak demand for Ivoirians trained in economics and the practically non-existent governmental demand for people trained in other social sciences. A study done by the Office National de Formation Professionelle indicates a growing excess supply of university trained people in the Ivory Coast. In the case of agriculture, the educational system will turn out 1253 managerial and professional persons during the 1981-85 period, while there is only a projected demand for 351, about 28 per cent of the anticipated supply. For the category "Administration Economie Commerce" the projected supply is 9620 managerial and professional persons while the projected demand is only 3811.

The supply projections are likely to be much more reliable than the demand projections, but even allowing for prediction errors, the vast gap between supply and demand must surely be a matter of serious concern for the country.

3.0. Training and Research in the Rural Social Sciences.

Although there is not a strong demand for people with social science training in the Ivory Coast, there is some interesting training and research going on.

3.1.0. The Université Nationale de Côte d'Ivoire - Abidjan.

The University of Abidjan has a large Faculty of Economics. For the academic year 1980/81 the Faculté des Sciences Economiques had a full-time staff of 74. They were broken down as follows.

Table 1

Teaching Staff - Faculty of Economics

University of Abidjan

1980 - 1981

Rank	Nationals	Expatriates	Total
Professors and Maîtres de Conférence	3	6	9
Maîtres Assistants (docteurs d'état)	9	7	16
Assistants (docteurs 3e cycle)	9	6	15
Assistants (without doctorate)	7	27	34
Total	28	46	74

There are two noteworthy facts about the table:
(1) there are almost twice as many expatriates as there are nationals; and
(2) more than half of the expatriates do not have doctorates.

Since the majority of the staff do not yet have their doctorat d'état, most of the research done in the Faculty is work on dissertations to obtain higher degrees. Four of the staff members are also on the staff of CIRES and are involved in the research program of that institution.

The Dean of the Economics Faculty indicated that the research that is done is strictly of an academic nature. He would like to see the staff become more involved in applied and policy related research. The staff members have not yet responded to his urgings; in his words, "they are not very aggressive" (in getting involved). The Dean has plans to get some people into collaborating with governmental agencies concerned with development problems. At the moment there is no institutional contact with ministries, but two staff members are advisors to the Ministry of Economics and Finance.

Staff members doing research are entitled to a research bonus (prime de recherche) of 150,000 CFA (about $ 550) a year, but the bonus has been awarded more or less automatically, regardless of performance. The Dean wants to link this bonus in the future more closely to research performance.

The Economics Faculty has a very large number of students, 2101 to be exact for the current year. The breakdown by years could not be obtained,

but it was indicated that there were many more students in the first than in the fourth year as a result of both growth and dropouts. Since 1968 the three-year Licence has been replaced by the four-year Maîtrise. There are three segments, called "cycles", in the program. The first two years involve basic training in economic and quantitative principles, along with some history of economic ideas. After two years the students obtain a Diplome d'Etudes Universitaires Générales (DEUG). About 90 per cent of the students who pass the first two years enter into the second "cycle", which involves two more years of advanced analytical and quantitative work. At this stage the student must choose between public sector and business economics.
The public sector option emphasizes subjects like national income accounting, public finance, monetary economics and international economics. The business option stresses business accounting, business finance, and other business topics. On the whole the program follows very closely the standard French pattern and makes few concessions to the fact that this is a university in a developping African country. The training stresses analytical and quantitative concepts rather than problems and policy issues.

At the end of the third year of study the students get either a Licence d'Economie Publique or a Licence d'Economie d'Entreprise. About 90 per cent of the students who obtain the License will go on to the fourth year to prepare either a Maîtrise d'Economie Publique or a Maîtrise d'Economie d'Entreprise. In 1981 some 200 Maîtrises were awarded, about 50 in public sector economics and 150 in business economics. Even when allowance is made for overall increases in enrolment, the number of Maîtrises awarded implies over a 50 per cent dropout rate over the four-year course of study.

The Abidjan economics program is essentially an undergraduate program. There are no post-graduate courses, although the University awards advanced degrees based on research. About 10-20 per cent of those obtaining a Maîtrise will go into the third "cycle" which leads to the Doctorat de 3e Cycle, two years after the Maîtrise.

In 1980/81 the Faculty of Economics had some 15 students in the first year of the third "cycle", after which they get a Diplôme d'Etudes Approfondies (DEA). For the doctorate most of the candidates go to study abroad, mainly to France and the U.S.

The Dean indicated that many economics graduates are having difficulty finding jobs, especially those who major in business economics. Most businesses prefer to hire graduates from commercial schools, who are more extensively trained in practical skills like bookkeeping. Those majoring in public sector economics have somewhat less difficulty, but is not clear whether that is the result of stronger demand or of the fact that there is a smaller supply.
Most of these students look for jobs with the government or with parastatal organizations.

3.1.1. The Institut de Linguistique Appliquée (ILA).

A rather interesting project relevant for rural development is carried out by this institute of the University of Abidjan. The researchers study the structure of indigenous languages and try to establish conceptual equivalents between a local language and French. On the basis of this research, they create a limited French vocabulary that is applicable to the everyday life of farmers. This French vocabulary, in the form of simple sentences, is then taught orally to people in villages who have

already learned to read and write in their own language. The director of the ILA claims that in a matter of a few weeks people can learn to carry on simple every day business transactions in French and can understand simple instructions given by development agents not familiar with their language. The ILA is both a teaching and a research institution. It has a variety of programs, but the one mentioned receives the most attention.

3.1.2. The Institut de Géographie Tropicale (IGT).
This Institute has a strong interest in rural development, with a spatial focus on "rural human geography". The approach is essentialy multidisciplinary. The researchers are interested in the economic, social and political organization of rural societies and the relationship of structure to social and economic interactions spatial arrangements, and value systems. The emphasis seems to be on description rather than analysis. Almost all of the research done is related either to a doctoral dissertation of some kind or to a mémoire de maîtrise. A current dissertation to be presented at Paris-Nanterre is entitled: "L'économie de plantations en Côte d'Ivoire Forestière". Another dissertation to be presented at the same university is entitled: "La dynamique et l'organization de l'éspace rural entre le Sassandra et le Bandama". There are also several recent mémoires dealing with plantation agriculture in the neighbourhood of Abidjan. Another relevant area of specialization of the IGT is regional planning (aménagement régional). Much of this work is urban oriented, but the Director has an interest in rural development. One of his current research topics deals with the reception by rural populations of governmentally sponsored development schemes.

The IGT is both a teaching and a research institute. It has 16 full-time staff members; eleven nationals and five expatriates. The enrolment is about 150 students. They award around 30 Licences per year, 5 to 10 Maîtrises and 2-3 doctorats de 3e Cycle. Almost all of these graduates go into secondary teaching; the advanced students go into research or higher education. The IGT has not had much success in convincing ministries or governmental agencies of the relevance of their work for rural development. IGT staff members occasionally do studies for international agencies but very few for the Ivorian government, other than the preparation of atlases.

3.1.3. The Institut d'Ethno-Sociologie (IES).
This institution is linked to the Département des Sciences Sociales of the Faculté des Lettres et Sciences Humaines. The objective of the IES is to teach and do research of a multidisciplinary nature on the broad theme of "Peoples and Civilizations of the Ivory Coast". The Institute has a staff of 17 including eleven teachers/researchers, and six full-time researchers. All but one of the staff members are Ivoiriens. The IES awards about 60 Licences per year in sociology, including 20 in rural sociology, and about 40 Maîtrises. There are fewer students now preparing the Maîtrise in sociology than previously, because there are not many jobs available for them. Ministries and parastatals prefer to hire people with agricultural training to deal with rural development. The IES has not emphasized rural studies. Of some 40 research projects that have been undertaken sinze 1973, some of which are still in process, only four deal with rural subjects:
(1) "The Commercial and Domestic Activities of Women in a Rural Setting",
(2) "The Socio-Economic Realities of a Worker Village",
(3) "Study of Housing in a Rural Setting", and
(4) "Migration among the Akans".
The studies are all academically rather than policy or problem oriented.

This orientation no doubt account at least in part for the lack of interest on the part of technical ministries and parastatals. The IES carries out a considerable amount of research, but all of it of a strictly academic nature. This is work which contributes to basic knowledge of the country and to the development of the discipline.

3.2. The Centre Ivoirien de Recherche Economique et Sociale (CIRES).

The CIRES is the most important center for economic and social research in Francophone Black Africa. It was created by presidential decree in 1971 and has been functioning since 1974. Unlike to IGT, the IES and the ILA, the CIRES is strictly a research institute. Although four of its staff members teach in the Faculty of Economics, the center itself does not have a teaching program. It sees itself as a link between the University, for which it provides a factual and analytical basis for the study of the Ivorian economy, and the Government, which it seeks to assist through a program of policy oriented research. The CIRES is consciously trying to break through the traditional French compartementalization of the spheres of activity of the University, the Grandes Ecoles, and government policy makers. Its success in this endeavor has so far been extremely limited.

The CIRES has currently a resident research staff of 20 persons, not including recent university graduates (Maîtrise holders) who work as research assistants for 18 months before they are sent abroad for further training. Among the 20 researchers, there are 12 Ivoiriens, 5 Europeans, and 3 non-Ivorien Africans. Among the Ivoiriens, 1 has a Doctorat d'Etat, 2 have Ph.D.'s, 2 have Doctorats de 3e Cycle, and 7 have degrees at the master's level. At this time, there are 18 future staff members in training in the USA, four of whom are studying agricultural economics. The CIRES has facilities for a staff of 40 researchers. By 1985 it wants to achieve its target of 40 Ivoirien researchers, including 15 agricultural economists and 6 social anthropologists. Most of the new people are being or will be trained in the U.S. under fellowships provided by USAID. The choice of North American training is deliverate and is explained with reference to the problem orientation of this kind of training and the desire to have bilingual researchers.

The research program of the CIRES is divided into 6 areas:
(1) Agricultural Economics,
(2) Human Resources,
(3) Industry and Technology,
(4) International Trade and Economic Integration of West Africa,
(5) Monetary and Financial Economics, and
(6) Management.

By far the most important of these areas is Agricultural Economics, which occupies 9 of the 20 researchers (7 Ivoiriens and 2 expatriates) and 3 research assistants. The topics emphasized in Agricultural Economic are:
(a) production systems in the forest and savanna zones,
(b) livestock in combination with agriculture,
(c) marketing of food crops, and
(d) agricultural cooperatives.

The area of human resources occupies 3 researchers dealing with
(a) demography,
(b) health,
(c) education, and
(d) employment.

In the area of Industry and Technology and in the area of International Trade and Economic Integration there are 2 researchers in each. Finally, in Monetary and Financial Economics there are 3 researchers and in Management there is one. Plans for future expansion involve adding energy economics, nutrition, and general planning.

Until now most of the publications which have come out of CIRES, mainly articles in the Cahiers Ivoiriens de Recherche Economique et Sociale, have been by expatriates. In 1980, however, there was for the first time a slight edge in favor of Ivoiriens.

The vast majority of the working papers put out by CIRES have also been by expatriates. Presumably, this trend will also be reversed as the Ivoirien staff matures, and more Ivoiriens will emulate the one or two of their national colleagues who are highly productive.

The desire by CIRES to be more closely linked to governmental ministries received a set-back in 1979 when responsibility for the Center was shifted from the Ministry of Scientific Research to the Ministry of National Education. Until 1979, there was a ministerial committee reviewing the Center's research program, which at least maintained a direct line of communication with technical ministries. There is no longer such a committee. The research program is now determined completely internally. There has also been a decrease in governmental financial suport since 1978, which has mostly been made up by increased external assistance. The total budget of CIRES has increased from 13,150,000 CFA in 1974 to 68,000,000 in 1981 (about $ 243,000 at today's exchange rate).

3.3. The Ecole Nationale Supérieure Agronomique (ENSA).

The ENSA program is designed to turn out "functionaires" with a background in the agricultural sciences. The basic program of ENSA itself takes two years. The students entering ENSA have already spent two years in the Faculty of Sciences at the University. During their two years at ENSA the students concentrate on agricultural science. They get a very brief introduction to general economics and rural development, none of which seems to relate much to conditions and problems in the Ivory Coast. At the end of two years at ENSA, the students are awarded a Diplôme d'Agronomie Générale. If they complete a third year, which may be at ENSA or abroad, they may specialize in various fields including "economics and development". The courses taught under this heading at ENSA have little to do with either agricultural economics or rural development. This situation may change in about 3-5 years, when the school will move from its present location to Yamoussoukro. The school, which now turns out about 30 to 40 ingénieurs agronomes a year will double its enrollment at Yamoussoukro. It will also have an expanded program, including a third year specialization in agricultural economics. But for the time being, the school cannot be looked to for people trained in agricultural economics or rural development.

3.4. The Institut Africain pour le Développement Economique et Social (INADES).

This private international organization has been in existence since 1962. It was started on the initiative of a group of French Jesuits who were concerned with the fact that most of the development information passed out to the masses in Francophone Africa had a strong Marxist flavor. In 1965 the decision was taken to concentrate an peasant agriculture. Today INADES has training activities in 19 African countries and offices in 8, including the head office in Abidjan.

The main activity of INADES is a form of extension training by correspondence Villagers who subscribe to the program pay a modest fee, in exchange for which they get a series of very simply written booklets dealing with the subject of their choice. They are usually organized to study in groups around a local leader (often a teacher), but each participant must individually do the written homework which is sent to INADES for correction. The extension program has about 50 different carefully prepared and field tested booklets dealing with all kinds of crops and livestock raising. Currently there are some 3000 - 3500 subscribers thoughout Africa, each of whom received a booklet and homework each month.

INADES has also a higher level correspondence course entitled "Cours d'Initiation au Développement" which is aimed at administrative officials. In addition, it maintains a library on development subjects, publishes a magazine on rural development, and offers a bibliographic and an answering service.

INADES claims to have many testimonials to the success of its approach. It employs in all some 200 professional people, mainly in the training program, which has an annual budget of 500 million CFA ($ 1,785,714). About 10% of this budget is paid by the beneficiaries, and the remainder comes from aid and charitable donations. The cost amounts to a little over $ 500 per participant per year, which has a chance of being highly cost effective in terms of increased output or improved standard of living.

.0. Concluding Remarks.

The Ivory Coast has strong potential capacity for turning out trained people and research in the rural social sciences. At this time, however, there is no strong drive on the part of the government to make use of these local resources. The government's method of operation can be expected to change before too long, as the cost of the expatriate input rises and national talents increase in number and quality. Any measure which strengthens the national rural social sciences is likely to improve their utilization by the government. It would be of great assistance to the Ivory Coast to have a series of seminars or workshops which would bring together experienced rural social scientists and government policy makers. There should be representatives from both the national and the international social science establishment who can illustrate in very practical ways the role of applied social science in policy analysis and rural development. The aim of the workshops would be to improve the policy makers' appreciation of the usefulness of applied rural social sciences as well as to get them acquainted with the available resources in relation to the country's needs. It would also be profitable to promote closer interaction between rural social science programs of different institutions, especially between agricultural economics at CIRES and ENSA.

Chapter 5

K E N Y A

1.0. Overview.

In Kenya as in many other African countries agriculture is the most important sector of the economy. Kenyan agriculture generates about 35% of the gross domestic product and employs about 80% of the labor force. But agriculture remains a low productivity sector, with a value added per worker which is only about 13% of the average of the non-agricultural economy. Low productivity is concentrated in subsistence agriculture. In the past most of the agricultural improvements have focussed on the cash crops and on the commercial livestock sector.

In recent years there has been a growing appreciation of the role of social science in the overall development of the Kenyan economy, but this appreciation exists primarily in relation to planning and policy formulation, where the need is most evident. In agriculture, the need for social scientists is perceived mainly in terms of economic planners and people skilled in project preparation and analysis. The demand is mainly for econmists and agricultural economists, who are needed to deal with the problems and policies of an increasingly complex economy. There is less appreciation of the role of social scientists at the level of agricultural production and rural development. This applies especially to the potential contribution of sociology. Perhaps this relative lack of appreciation of the role of social science at this level is a consequence of the emphasis on cash crops rather than subsistence farming.

2.0. The Demand for and Uses of Social Scientists.

There are two ways in which Kenyan Government officials see the role of social science training. The first role is in the training of the generalist civil servant. This role is performed by appropriate courses in economics, sociology/anthropology and geography as part of the B.A. and B.Sc. curricula. The second use of social science is the training of professionals in the various social science disciplines, which means post graduate training to the M.A. or M.Sc. level for people who are essentially "technicians" and to the Ph.D. level for people who are "analysts" and "conceptualizers".

2.1 The Ministry of Planning and Development.

Until now the main emphasis has been on the recruiment of "technicians" with training in economics. Individuals who are recruited as economists become part of a separate professional civil service scheme. They are recuited by the Ministry of Planning and Development and posted either within that Ministry or in other Ministries. At present, the scheme has about 150 economists who have been recruited in this fashion. The Ministry of Planning and Development gets to pick the top of the crop of the B.A.'s (Econ.) from the university of Nairobi. Those with first class or upper second degrees are sent for training to the M.A. level after about two years of service. Those with a lower second degree are sent to prepare a B.Phil. degree at the University of Nairobi. This is a program which was specifically created for the Ministry of Planning. After two years of service almost all holders of B. Phil. degree are sent for training at the M.A. level. Most of the M.A. training is done abroad.

After several more years of service the most promising holders of the M.A. degree may be sent for the Ph.D. degree in some foreign university. Over the last 10 years only 3 or 4 individuals have been sent abroad for the Ph.D., and so far none of them have completed their studies. Although this formalized scheme for professional upgrading appears attractive, it represents a rather slow road to advancement in government service. Civil servants who remain generalists often can get promoted faster through accumulation of years of service rather than education. Moreover, professionals at an advanced level often are expected to carry more onerous workloads than generalists.

At present there is both a qualitative and a quantitave shortage of economists in the ministries. The most serious shortfall is on the qualitative side. The Ministry of Planning and the planning units in other ministries need well-trained and experienced economists who are capable of high quality technical analysis and can make mature judgements on policy issues. The Ministry of Planning could manage well if it had 5 to 10 top calibre economists, supported by an appropriate number of "technicians". At present there are not enough Kenyans coming through the training pipeline to meet this need. The Planning Ministry as well as other ministries therefore have to rely on experienced expatriate advisors furnished by external aid. The current rate of sending 3 or 4 people over a ten year period to obtain at the Ph.D. level is far too slow to meet the planning requirements of the ministries. When account is taken of leakages and unsuitability for top level professional work in government, 3 or 4 candidates for the Ph.D. should be sent for training every year. Not all highly trained economists are suitable for top level government employment, because they lack the aptitude for producing timely high quality work. The quality of advice the economic advisor may render his permanent secretary becomes irrelevant when the advice is not available at the time when decisions have to be made.

The qualitative shortfall which faces the ministries is related to the quantitative shortfall. At the present rate of annual recruitment of around 8 to 10 graduates per year, it is not possible to end up with 3 to 4 candidates who will eventually qualify for Ph.D. training. It is estimated also that less than half of those trained to the Ph.D. level would be willing or suitable to function as top level planning economists, though they may be quite suitable for academic or research posts.

While the shortage of experienced macro-economists is most critical, there is also a shortage of micro-economists. In the Ministry of Planning work at the micro-level is considered to be primarily technical in nature and to require essentially a good M.A. rather than a Ph.D. The Ministry estimates that the number of M.A. level "technicians" should be doubled over the next five years. This means that some 30 M.A.'s should be added to the professional staff every year, in order to add another 150 in five years. To achieve this goal it would be necessary to treble the present rate of recruitment of graduates. This goal cannot be achieved unless there is a substantial increase in the number of first class and upper seconds turned out be the University every year, which in turn depends on a substantial strengthening of the relevant departments in the University. In recent times, the available pool of graduates has not increased. It may therefore take fifteen years for the government to add 150 economists to the professional scheme.

2.2. The Ministry of Agriculture.

The Ministry of Agriculture has a substantial professional staff with training in agricultural economics but very few with training in other rural social sciences. Most of the agricultural economists are concentrated at the central offices of the Ministry and are concerned with planning and policy issues rather than with the micro-economics of farm level production. The center of economic analysis within the Ministry is the Development Planning Division (DPD), which houses some 40 economists, about 10 expatriates and 30 kenyans. Most of them are agricultural economists. The main function of the DPD is project preparation and commodity analysis. They do not engage much in overall policy analysis of the agricultural sector, which is a task that seems to receive little attention. Part of the difficulty lies within the structure of the Ministry. While the Development Planning Division reports to the Permanent Secretary, the operative divisions of the Ministry report to the Director of Agriculture. There is a weak coordination between the planning and the operative divisions, although each of the operative divisions also has one or two agricultural economists.

The Ministry of Agriculture tends to operate in terms of "programs" but many of the problems it faces are essentially regional. The Ministry does have a rather elaborate nationwide network of offices and officials, including 7 provincial directors of agriculture, 40 district agricultural officers, and below them 200 divisional technical officers. All of these people have university degrees, or in the case of divisional officers, sometimes a two-year diploma.It is not clear how much economic or rural social science training these people have. Below the divisional level there are 1000 local offices headed by technical assistants who normally have a secondary education and practical training in agriculture. Below that level there are 22000 sub-locations run by local farmers who have received short-term training. There is wide disagreement among government officials over the effectiveness of this elaborate and expensive extension system. Some believe that agricultural productivity would be increased if the extension systems scrapped and the resources saved were used to increase producer prices. The one aspect on which there is apparent agreement is that the system operates too much in a top-down fashion, without any feedback from the farmers. There is a very serious lack of baseline information, which is needed for the preparation of appropriate extension packages and for policy impact analysis.

There are currently a number of agricultural development projects in the country which do use a multidiciplinary approach and make use of feedback information generated from the farmers. One of these is the CYMMIT East African Economics Program, under which young agricultural scientists are initiated to farming systems research through CYMMIT workshops. The farming systems research approach focusses on the small farmer and offers alternatives to traditional agricultural research, which in Kenya has been large farm and cash crop oriented. The farming systems approach involves a multidisciplinary assessment of the priority needs of defined and fairly homogenous groups of farmers. These needs are then translated into an extension strategy which takes into account the whole household economy, not just agricultural activities or resources. At present the CYMMIT program offers the only training in East Africa in farming systems research. Dr. Collinson,the CYMMIT economist, and his CYMMIT associate use local professionals in their demonstration programs and offer in-service training. They publish a semi-annual newsletter and run two ten-day workshops each year. The demand for their services is much larger than they can provide. If the farming systems research approach is to succeed, there is strong need for a considerable widening of the efforts now provided by the CYMMIT project. The attempt by the leader of this program to influence the university curriculum in rural economy has not been successful. One of the major training needs which was pointed

out relates to expatriate advisors who are unfamiliar with both the farming system research methodology and the local setting.

There are several other projects which use a multidisciplinary approach and which have rural social scientists (including social anthropologists) on their teams. These are mainly externally financed projects, such as the Machakos Integrated Development Program financed by the EEC. Most of these programs are in arid and semi-arid zones. The World Bank is financing a project in Baringo, USAID in Kitui, NORAD in Turkana and the British in the Embu, Meru, and Isiola districts.

A rather recent innovation in Kenya was the addition of agricultural economists to agricultural research stations. There are now 12 of them in these positions, but they are still in a junior position in relation to the agricultural sciences researchers. The Secretary to the National Council on Science and Technology indicated that it is the government's intention to add agricultural economists to all agricultural research stations. There are no plans at present to add other rural social scientists. Another recent change is the addition of an economic advisor to the board of the Scientific Research Division of the Ministry of Agriculture. This may improve the position of the agricultural economists in the research stations, since they report to the economic advisor. The situation is rather unclear because the functions of the Scientific Research Division are supposed to be taken over by the recently created KENYA Agricultural Research Institute (KARO). One of the major functions of the economists at the research stations is to participate in the preparation and evaluation of extension packages.

Another dimention of the demand for personnel in the rural social sciences is provided by the 1978 manpower survey carried out for the governments of Kenya and USAID by the General Research Corporation of Mclean, Virginia. The following table is extracted from the report on this survey, which covered both the public and private sectors.

Although the survey is somewhat dated, it shows large gaps in the relevant disciplines at all levels of training.

TABLE I

Kenya Rural Social Science Staff in 1977 and Additional requests for 1983 and 1988:

Training level	Agric. Econ.	Agric. Educ.	Land & Farm Management	Range Management
Masters & Ph.D.'s in '77	11	3	6	4
Add. Requests 1977/83	35	9	5	7
Add. Requests 1977/88	89	13	11	12
Bachelors in 1977	75	19	36	30
Add. Requests 1977/83	72	53	64	72
Add. Requests 1977/88	162	62	90	85
Diploma Holders in 1977	95	34	84	52
Add. Requests 1977/83	182	64	405	66
Add. Requests 1977/88	267	67	716	89
Certificate Holders 1977	140	61	172	120
Add. Requests 1977/83	458	151	783	193
Add. Requests 1977/88	798	177	1024	279

Source: Kurt Hecht et al, Professional and Subprofessional Agricultural Manpower in Kenya, Report prepared by General Research Corporation for GOK and USAID, March 1978, Table 16, p. 54.

The largest relative gap is between staff in 1977 and perceived needs by 1988 is in agricultural economics at the postgraduate level. This area requires an eight-fold increase for this period.

3.0. Training and Research in the Social Sciences.

Training in the social sciences in Kenya at the degree and postgraduate level takes place at the University of Nairobi in the Faculty of Arts (Dept. of Economics, Dept. of Sociology, Dept. of Government), and the Faculty of Agriculture (Dept. of Agricultural Economics). Diploma level training is offered at Edgerton College, which is the only diploma level agricultural training institution in Kenya. Although Edgerton College stresses general agricultural training, it does have programs in Home Economics, Agricultural Education, and Farm Management. At the certificate level there are three institutes - the Bukura Institute of Agriculture, the Animal Health and Industry Training Institute (AHITI), and the Embu Institute of Agriculture - which along with Agricultural Engineering, Crops and Animal production have departments in Farm Management and Extension and in Home Economics.

3.1. University of Nairobi - Department of Economics.

The Economics Department is one of the oldest departments in the university of Nairobi. It now has a staff of 16 members in residence, including 4 expatriates. One half of the staff members have Ph.D's, including the 4 expatriates, which leaves 4 Kenyans with Ph.D.'s. There are two agricultural economists on the staff. Most observers feel that the Economics Department is not as strong now as it was a few years ago, but then it was staffed overwhelmingly with expatriates. Experienced expatriate professors have been replaced by rather young Kenyans. At present the average age of the staff is about 32. Under normal circumstances one would expect a fairly rapid maturing of this staff. However, there are circumstances which militate against the maturing process, the most important of which is turnover. Opportunities outside the University, especially in the private sector and in international organizations lure Kenyan economists away from University posts. In this regard the situation is similar to that in Tanzania, except that in Tanzania it is the Government that absorbs the university staff. Dr. David Court of the East Africa Office of the Rockefeller Foundation has illustrated the attrition of University staff with reference to the Rockefeller Foundation scholarship program of 1963-77. During this period 40 of the most promising students in East Africa obtained a Ph.D. overseas, with the expectation that they would return as staff members to the universities that selected them. Today, only 8 of the 40, or 20%, are still working in a university. Another illustration given by Dr. Court highlights the mobility of the most senior people. Of the 13 individuals who were appointed as the first indigenous heads of the social science departments and research institutes of the Universities of Nairobi and Dar-es-Salaam, only 3 remain in the University after one decade. Of the ten, who moved on, eight work in international organizations.

This attrition is a refelction of the high demand, in relation to supply, for social scientists, especially economists. Another manifestation of this shortage is the high demand for consulting services. This demand comes from a variety of sources, including government, the private sector, regional and international organizations. For the most able individuals, the consulting demands have reportedly crowded out the more academically oriented forms of research. Consulting activities render useful social services and give university teachers practical experience which may enrich their teaching. There is, however, a serious danger for the development of critical and searching scholarship when the quick problem-solving approach associated with consulting activity comes to dominate the intellectual scene. If the role of the University were merely to

train technicians who can tackle practical problems, there would be no cause for concern. But the University also has to train the critical and analytical faculties of those future leaders who will have to imagine and conceptualize alternative goals and strategies.

The University of Nairobi requires that staff members do research and publish in accepted academic journals. This requirement, at least as far as economics is concerned, does not seem to be very demanding. Or, it is not sufficiently demanding to incite a vigorous level of research in competition with consulting. It is significant that there are rather few articles published in refereed journals by the local staff. In economics, journal articles are the main index of scientific activity.

The Department of Economics offers a B.A. (Econ.) as well as postgraduates degrees at the B. Phil., M.A. and Ph.D. level. Students in the B. Phil. program are sponsored by the Government. This is a one-year degree program which was designed to upgrade the training of B.A.'s with a lower second degree. If such students decide to go on for an M.A. at Nairobi, their B. Phil. degree will count as the first year of the M.A. program. Very few students select this option since the government sends most of its people abroad for the M.A. degree, mainly to Canada and the U.S. The following table gives the number of students enrolled in the economics program for the period 1978-1981.

TABLE II

Enrolment in the Economics Program

University of Nairobi 1978-1981

Undergraduates	1978 - '79	1979 - '80	1980 - '81
1st year	208	169	146
2nd year	66	188	158
3rd year	40	74	185
	314	431	489
Postgraduates			
B. Phil.	8	5	10
M.A. 1st year	6	4	6
2nd year	6	7	5
Ph. D.	2	7	10
	22	23	31

Source: University of Nairobi Economics Department Handbook, December 1980.

The undergraduate program resembles that of almost any American university. It is to provide the student a solid training in economic analysis and quantitative methods and offers a range of applied courses in the standard subfields of economics. The third year offers an elective course in agricultural economics which is taken by 15-20 students every year. At the postgraduate level, courses are taught for the B. Phil. and M.A. degree.

The Department feels that the number of students enrolled for the M.A. is too small to maintain a vigorous program. The training abroad of the most able M.A. candidates deprives the teaching staff of the intellectual stimulation which a group of bright students can provide. The Ph.D. program does not involve additional course work and consists entirely of supervised research. The 1980 departmental handbook lists 14 theses in preparation, half of which are concerned with agriculture or rural development. Of the 39 M.A. papers and theses that have been written since 1975, eleven deal with agriculture or rural development.

The chairman of the economics department indicated that for the moment his greatest need is for experienced staff, and his second most pressing need is for fellowships to send people who have M.A.'s abroad for the Ph.D. With existing university salaries it is difficult to attract either high quality Kenyans or high quality expatriate. For Kenyans there is another potential obstacle in the fact that the Department has established posts for only one professor, two associate professors and a very limited number of senior lecturers. Once these posts are filled with relatively young people, it may take a very long time before a lecturer can be promoted. He or she could advance much more rapidly in either government or business.

3.2. The faculty of Agriculture.

The Department of Agricultural Economics of the University of Nairobi is in the Faculty of Agriculture located in Kabete, outside of Nairobi. This Faculty was started in 1970 and now has 8 departments, including the Department of Agricultural Economics. There is no B.Sc. in agricultural economics, but all students in the Faculty of Agriculture are required to take two courses in economics (one micro and one macro), a course in rural sociology and development, a course in farm management and a course in agricultural marketing and extension. Some courses at this level are rather large and the teaching staff have considerable difficulty generating relevant teaching materials.

The M.Sc. (Agr. Ec.) degree is designed for students who have a first degree in agriculture. The M.Sc. program requires 12 months (4 terms) of course work, and from 6 to 12 month for the preparation of a thesis. The course program contains a good foundation in micro theory and in quantitative methods, as well as courses in farm management, marketing and project evaluation. On the whole it is oriented toward the problem of large-scale commercials rather than peasant agriculture. At this time there are 15 students in the M.Sc. (Agr. Ec.) program. The normal output is from 6 to 10 masters degrees per year. Most of the students are sponsored by the Ministry of Agriculture. The Ph.D. program in agricultural economics consists of supervised research.

The staff of the Department of Agricultural Economics consists of 12 established posts, 7 of which are filled at this time. The Department is sponsoring 6 candidates for Ph.D. training abroad. The current staff includes only one expatriate, but most of the Kenyans have only recently returned from training abroad. Until now there has not been the attrition of this staff that was observed in the Economics Department. Part of the reason is that only one of the staff members is past the three years of obligatory university service after returning from overseas. Another reason is that there is so far less pressure on the staff for outside consulting services. The Department Chairman expects this demand and the ensueing instability to increase in the future. For the time being his greatest need is to build up the strength of the staff and to fill all the established posts. Once this happens, however, the Department will be locked into the rigid rank pyramid which allows for only one professor, one associate professor and three senior lecturers.

Promotion is based in part on research and publication, but the requirement does not seem to be very stringent. The Chairman, who obtained his Ph.D. in the U.S., did not think that it was very difficult to make the transition from his training abroad to teaching courses that are locally relevant. Part of this ease may be the result of the commercial farming orienttation of the Department.

3.3. The Department of Sociology.

This Department has a staff of 16 persons at the professor, associate professor, senior lecturer and lecturer levels. All but two of them are Kenyans and almost all have Ph.D.'s. The Department appears to be fairly strong and seems to put more emphasis on journal publications than the Economics Department. To be promoted to senior lecturer the Department expects an individual to have published 15 to 20 articles or a solid book. The Sociology Department is not exposed to the same outside demand for services as the Economics Department. Relatively few sociologists are demanded by the government or the private sector. The staff do some consulting, but not as much as they would like to.

The number of students registered in sociology is given by the following table.

TABLE III

Students Registered in Sociology
University of Nairobi 1978-80

year	first year	second year	third year	Master	Ph.D.
1978/79	339	98	92	21	7
1979/80	200	280	98	19	7

Source: University of Nairobi, Department of Sociology, Departmental Handbook, 1981/82.

Only 15 to 20 students prepare a B.A. in pure sociology. The remainder take sociology as part of another degree. Until now the Department of Sociology has taught a course in rural sociology for the Faculty of Agriculture. All sociology students are required to take a course in rural sociology as part of their degree. At the M.A. level there is an option in rural sociology. The Ph.D. degree is a research degree. Partly because the previous chairman was a rural sociologist, this area has received considerable emphasis in the Department. The present chairman feels that their greatest need is for more staff to handle the course work. All courses have tutorials which require a lot of contact hours. The second most important need is for research support. They have very limited resources for field investigations.

3.4. The Institute for Development Studies (IDS).

The institute is part of the University of Nairobi and is a multidisciplinary research institution which was created in 1965. During the first ten years of its existence, the IDS achieved a reputation for producing studies of high quality. It managed to attract some of the top names in the international economics profession as visiting researchers. In recent years the research output has dropped off considerably because the IDS now has fewer experienced researchers and also because the present staff is heavily committed to consulting work.

4.0. Concluding Comments.

In spite of the substantial sums that have been poured into the development of social sciences in Kenya over the last two decades, the country is still far from closing the gap between the demand and supply of social scientists. On the demand side the shortfall is most serious at the level of highly trained and experienced economists, but there is also a shortfall in the required number of "technicians" (M.A. level economists).
On the supply side, the university is well equipped to provide high quality training up to the B.A. and B. Phil. level. At the postgraduate level, the Unviversity could train more people at the M.A. and M.Sc. (Agr. Ec.) level than it actually does, but it is in need of more senior people who are research oriented to offer solid postgraduate degrees and to promote the growth of a self-renewing community of social scientists.
Kenya does not suffer from lack of government use of University Social Scientists. On the contrary, there seems to be some danger of overutilization. Some questions remain about how effectively the government uses its own professionals.

Chapter 6

N I G E R I A

1.0. Overview.

Nigeria is the most populous country of Africa. By its sheer size and by virtue of its rich human, mineral and agricultural resources, it holds in many ways a unique position among African countries. It shares, however, with most African countries a declining output in per capita food production. Nigeria has the agricultural potential to feed its growing and increasingly urban population, but to reverse the growing food shortfall will require a major coordinated effort. The Government of Nigeria has for some time recognized the importance of this problem and has initiated a number of programs and production campaigns. The most significant of these programs has been the Integrated Agricultural Development Projects (ADP's) financed partly by the World Bank. This program started in 1975 as enclave projects in Kaduna, Bauchi and Sokoto states. More recently preparations were undertaken for extension of these projects on a less intensive but state-wide scale (Accelerated Development Areas) and to establish new ADP's in other states. It is expected that eventually all 19 states will have ADP projects. These projects have achieved mixed but on the whole positive success. The Federal Ministry of Agriculture is under considerable pressure to expand them as rapidly as possible.

There are serious practical constraints which limit the rate at which ADP's can be extended. They make very heavy planning, organizational and financial demands. At the same time the Federal Government has decided to achieve national self-sufficiency in food production by 1985, the final year of the fourth national development plan. To realize the magnitude of this goal, one has only to look at the size of the existing food gap. The following table taken from the final report entitled The Green Revolution: A Food Plan for Nigeria illustrates the point. The table assumes that the overall demand for

Table I

Projected Food Demand, Supply and Deficits, Nigeria 1980-85

	1980	1985	Deficit in 1985
Crops and Crop Products		(in 1000 tons grain equivalent)	
Gross Demand:	10520	22125	
Domestic Supply:			
at 1.0%/annum growth	16000	16835	5290
at 2.0%/annum growth		17600	4525
at 4.0%/annum growth		19400	2725
at 6.6%/annum growth		22125	0

Livestock Products

Gross Demand:	895	1060	
Domestic Supply:			
at .75%/annum growth	620	645	415
at 3.25%/annum growth		720	340
at 11.25%/annum growth		1060	0

food will be growing at the rate of 3.5% per annum, which is in line with what is known about recent experience. The recent supply of crops and crop products has been growing at only 1% per annum and livestock products have grown at a rate of .75% per annum.

If these trends were to continue, the gap in crops and crop products would grow from 2.62 million metric tons in 1980 to 5.29 million metric tons in 1985. Similarly, the gap in livestock products would grow from 270,000 tons in 1980 to 415,000 tons in 1985. In order to achieve the goal of self-sufficiency by 1985, the growth in production of crops would have to increase from 1% to 6.6% per annum, and the growth rate of livestock would have to go from .75% to 11.25% per annum. The required growth rates are higher than those achieved currently in any African country.

The strategy of the Green Revolution Plan, which intends to achieve these growth objectives, has been summarized by Professor F.S. Idachaba, the mission leader of the Plan, as follows:

- heavy reliance on the Nigerian smallholder as the centerpiece of incremental food production during the fourth plan period; a corollary is that minimum reliance should be placed on government companies and parastatals for our food production and distributions needs
- the Accelerated Development Area program as a cornerstone of the smallholders production strategy, as a complement to the successful ADP program
- private sector handling of input procurement and distribution; government ministries and parastatals are to divest themselves of these responsibilities
- massive Federal Government financial allocations for a rural infrastructure program: rural feeder roads, on-farm storage and processing facilities, minor irrigation works, rural and urban food market facilities...
- harmonization and nationalization of input subsidy and pricing schemes... and
- a dramatically expanded agricultural planning capability especially with respect to project identification, formulation, appraisal, monitoring, budgetary control, evaluation and food policy analysis.

It is this last point, of course, which is of particular relevance for this survey. Although Nigeria has now 13 universities, including four well established faculties of agriculture and several thousand graduates in economics and agricultural economics,

there is still a shortage of people who have the analytical capacity and the necessary experience, especially the organizational and managerial experience, to achieve the projected transformation of traditional agriculture.

2.0. The Demand for and Utilization of Rural Social Scientists.

The size and institutional capability of Nigeria makes it very difficult to get an overall view of the manpower requirements in the rural social sciences. Aside from the Federal Ministries and institution requiring high level manpower in the rural social sciences, there are 19 states each with its own ministry of planning and ministry of agriculture, as well as a large number of parastatal organizations and research institutes in the agricultural sector. Another factor which makes an overview difficult is the lack of data on employment. The mission on the Green Revolution estimated that in 1980 about 4,500 persons with professional training in all agricultural disciplines were employed in Nigeria. Of this total, they estimated 2,265 to be employed by the Federal Government (including all the universities), 2000 by the state governments, and 235 by the private sector. One can only guess at the number of this total that is represented by people with degrees in the rural social sciences. A reasonable guess would be that there are on the order of 900 to 1100 persons with degrees in agricultural economics in the country. Among those employed in the private sector the ratio of agricultural economists to agricultural scientists is no doubt more than 20 to 25 per cent, since among the private employers are banks who hire agricultural economists in their loan department. Banks are required by law to allocate a fixed percentage of their loan funds to agriculture.

Another source of information on employment is the manpower survey carried out in 1977 by the National Manpower Board. The survey as a whole had a response rate of only 67%, but for governmental bodies it was over 80%. According to this survey there were 1,496 agricultural officers employed in 1977 and 862 vacancies.

The vacancy rate was 36.5% on the basis of the 2,358 established positions. Again, it is not known how many of these agricultural officers were trained in agricultural economics. Probably the majority of them were, since other agricultural professions were listed separately in the survey. Although, the sampling of the survey is far from reassuring, the significant fact is the relatively high vacancy rate.

2.1. The Federal Ministry of Agriculture.

Very high vacancy rates were encountered also in the Federal Ministries which employ economists and agricultural economists. In the Federal Ministry of Agriculture, the agricultural economists are located primarily in the Planning Department. This Department has been in existence for some time, but until about a year ago it was operating at a "very low level". Since then the Government has decided to strengthen it and make it function as a real planning unit. As such, the Planning Department is responsible for coordinating the developmental activities and projects of the operating departments (crops, livestock, fisheries, forestry, rural development) of the Ministry of Agriculture. It is responsible for monitoring and evaluating the Ministry's

development program, including the projects of the agricultural parastatals, commodity boards and producing corporations. The Director of the Planning Department indicated that his main performance constraint is shortage of professional personnel. The Department has a professional establishment of 24 persons, but currently only 12 positions are filled. There is also a shortage of office space available to the Department at this time, which interfers with the efficiency of the existing staff. The Director believes that once space becomes available he will be able to fill the positions without difficulty, but mainly with new graduates. All of the twelve professional staff members of the Department have degrees in agricultural economics.

There are no Ph.D's among them; four have master's degrees, and three have post graduate diplomas. The Director himself has a B.Sc in agricultural economics from Ibadan. He has had in addition a one-year development planning course in Israel and has participated in project analysis, monitoring and evaluation programs offered by the World Bank.

The Director pointed out that to meet their responsibilities, they need to establish regional offices throughout the country for the collecting of data and the monitoring of projects. He believes that they should also have enough professional people to be able to do some internal studies. They should be the "think tank" for the Ministry. At present they can barely keep up with routine tasks and with evaluating studies done for them by outside agencies. The Ministry commissions special studies with the four faculties of agriculture in the country as well as with private local consulting firms. They use international consulting firms and agencies like the World Bank for major studies. In such cases there is usually a component of local experts on the team. An illustration of this approach is study on food policy (Green Revolution), which was carried out by a joint World Bank/Nigeria team, with a Nigerian leader. The two volumes of the final report were published under the imprint of the Ministry of Agriculture.

2.2. The Federal Ministry of National Planning.

The agency responsible for the overall planning of the Nigerian economy is the Central Planning Office of the Federal Ministry of National Planning. The Central Planning Office is divided into four departments: Macroeconomics, including the National Manpower Board; Transport and Utilities; Agriculture and Industry; and Social Services. Each Department in turn is divided into Divisions. The professional staffing is as follows:

Established Positions		Filled Positions
Directors	4	3
Assistant Directors	7	5
Chief Planning Officers	15	10
Assistant Chief Pl. Off.	20	12
Senior Plan. Officers	33	8
Planning Officers I	40	12
Planning Officers II	40	13
	159	63

Out of an establishment of 159 professionals only 63 positions are filled. The gap seems to be the largest in the lower ranks. A new graduate enters at the rank of Planning Officer grade II. Each year the Ministry gets about 20 applications for review and accepts about 15 as suitable for entry positions. Out of that number only about 5 or 6 in the end come to work for the Ministry, and many of them leave after two or three years. The main problem seems to be that employment in the Government is no longer competitive with the private sector in terms of salaries and fringe benefits. Those who have already achieved positions of responsibility are more or less locked in, but for young people starting out, employment in the parastatals or in the private sector looks more attractive. It was said also that the purges of the civil service carried out a few years ago have affected the morale and prestige of the civil service. It would obviously be difficult to gauge the effects of that event.

Among the staff presently in the Central Planning Office all those with the rank of Senior Planning Officer or above have at least a Master's degree or the equivalent. Four of them have Ph.D's. When new staff are recruited at the entering level they are usually sent abroad for a Master's degree after 2 or 3 years' employment. The reasons for sending them abroad is to get wider experience and to make the positions more attractive. At present there is no in-service training program, but the Ministry is considering establishing an Economic Planning Institute modelled after the Economic Development Institute of the World Bank. This Institute would offer short courses on various aspects of planning and project analysis for government employees.

With the present professional staff, the Central Planning Office cannot engage in any kind of in-depth analysis. Most of the time is taken up with routine day-to-day tasks. The acute shortage of junior professional staff forces the more senior people to handle much of the routine paperwork. For special studies and projects the Central Planning Office uses both local and international consulting firms as well as university consultants. Generally they prefer consulting firms to university consultants, primarily because consulting firms are more flexible and take less time.

The Division of Agriculture of the Department of Agriculture and Industry of the Central Planning Office is the agency which is the organizational link between the Ministry of National Planning and the Ministry of Agriculture. This division reviews and coordinates projects submitted by the Federal and State Ministries of Agriculture. It also monitors federally financed projects. The Division is seriously short on staff for the responsibilities it has. Besides the Director, there are 6 professionals in the Division: 3 of them have M.A.'s in economics, one has a M.Sc in agricultural economics, and two have B.Sc's. There are no special in-service training programs but there are workshops before the planning exercise is undertaken. The Division tends to lose staff to parastatals, even though the basic salary structure is the same. An officer will tend to move when the move enables him to jump into higher ranks.

3.0. Training and Research in the Rural Social Sciences.

It was not possible to obtain data that would indicate the number of people turned out annually in the rural social sciences in all

of Nigeria's 13 universities. The data furnished by the National Universities Commission to the National Manpower Board do not extend beyond 1978 and are by university faculties rather than by separate disciplines. In the five years from 1973/74 to 1977/78, Nigerian universities turned out 1637 B.Sc.'s in agriculture and 4073 students with first degrees in the social sciences.

3.1. University of Ibadan Department of Economics.

The strongest economics department in Nigeria and probably in Black Africa is that of the University of Ibadan. This Department has an established staff of 26. Of these, 16 were in residence, five were on leave, and four posts were vacant. The strength of the Department is reflected also in its rank structure, which includes five professors, two readers, six senior lecturers and thirteen lecturers. All of the staff members are Nigerians and all but two of them have Ph.D's. They have a supporting secretarial staff that is much larger than would be found in an American department of the same size. The average teaching load is ten hours per week, which includes four to six hours of lecturing and four to six hours of tutorials. This teaching load is not inconsistent with doing a substantial amount of research or other academic activity. It was not possible to obtain a recent list of publications by the departmental staff, but assurance was given that a great deal of emphasis is put on research and publication. It is the chief consideration for promotion. A senior lecturer is expected to have 10 to 15 articles published in well established journals, which is a very respectable performance in economics. The research projects listed by the Departmental staff cover a wide range of subjects. The most popular topics seem to be monetary economics and public finance as well as the energy sector. One staff member is working on an undergraduate economic text for Nigerian students.

Not much weight seems to be put on teaching performance as a condition for promotion. Some departments have student evaluations of courses, but the Economics Department does not use them and has little faith in them. Most of the research is on an individual basis. There is no team research program in the Department. Members of the Department sometimes work as a team on government consultancy or research contracts. It was not possible to establish the exact extent of this kind of work. Officially, all government contracts have to be channeled through the University's Consultancy Unit, which is supposed to see to it that individuals do not become excessively involved. The theory is that they are already paid for full-time employment and therefore can accept only limited outside commitments. There are no doubt some abuses of this limitation in practice, but assurance was given that it does not pose serious problems.

At the undergraduate level the Department offers a three-year B.Sc. in economics and a two-year Professional Diploma in Statistics (PDS). The B.Sc. program offers a good foundation in economic and quantitative analysis, as well as a number of elective courses in various applied areas such as monetary economics, public finance, development economics and comparative systems. During each term of the 1980/81 academic year, the Department offered around 20 courses, which included each term one accounting course and three or four statistics courses.

The students can also take courses in operations research, computer science, and project analysis.

The PDS program is partly funded by the Federal Office of Statistics and is designed to turn out statistical practitioners. It places emphasis on practical statistical training within the broader social sciences and with particular reference to local conditions and needs. All students in this program take at least ten courses in economics.

At the post-graduate level the Department offers M.Sc., M. Phil., Ph.D. and M.B.A. degrees. All of these degrees involve post-graduate courses. The M.Sc. is a one calendar year degree. It involves a qualifying examination and a research project but no thesis. The M. Phil. degree normally requires four semesters of course work and research after the B.Sc. degree. The Ph.D. is based on two years of course work and a dissertation. The Department lists a large number of post-graduate economics courses, although in any given year only six to eight are likely to be offered. The M.B.A. degree is awarded on the basis of three semesters of post-graduate course work, including a project. In addition, the Department offers a degree of Master in Planning Science (MPS) jointly with the Department of Geography.

The Department of Economics of the University of Ibadan has awarded from 80 to 120 B.Sc. (Econ.) degrees annually over the last five years. The introductory courses, however, have around 500 students each, because they are taken by all social science students. At the post-graduate level the Department awards each year around 10 M.Sc.'s and M. Phil's, 20 M.B.A.'s, 15 MPS's and 3-4 Ph.D's. These who earn Ph.D's take position mainly in the new universities. For those with B.Sc.'s and Master's degrees the preferred employment nowadays is the private sector, which pays better than either the universities or the government.

With regard to overall maintenance of quality standards, the argument was advanced that today the standards are higher than they were in the past. In spite of consulting opportunities and teaching demands, there is enough peer group pressure to maintain a high level of research and publication performance. The threat to standards, it was argued, comes mainly from the rapid expansion of the university system. A senior lecturer at Ibadan could jump to a professorship at a new university. Most of them seem to prefer their present positions. On the whole the Ibadan staff has remained fairly stable.

3.2. University of Ife Department of Economics.

The staff establishment of the Economics Department of the University of Ife is about the same size as that of the University of Ibadan, but the actual staff is more junior. There were 10 vacancies among the 25 positions of the staff establishment. The positions filled include one professor, three senior lecturers and eleven lecturers, all of them Nigerians. The number of undergraduate students is about the same as that at Ibadan. Ife awards 100 to 150 B.Sc. (Econ) per year. The graduate program, however, is much younger and less well developed. At the time of the visit, the Department had only three graduate students, altough eight had been admitted for the coming year. It awards one or two M.Sc (Econ) per year and so far has awarded only one Ph.D. in economics.

The content of the undergraduate economics program is similar to that of the University of Ibadan. To obtain a B.Sc. (Econ.) degree, a student takes a minimum of about 22 semester courses, including a compulsory course in mathematics for social sciences and a course in statistical methods. Students have the opportunity to take optional advanced courses in statistics, econometrics and mathematical economics. Many of the staff were trained in the U.S. and most courses seemed to be close replicas of American undergraduate courses, the exception being the courses dealing specifically with Africa and development.

Although it is very difficult to make accurate judgments, the impression is that teaching performance was slightly more emphasized at Ife than at Ibadan and research perhaps slightly less so. This may simply be the consequence of a more junior staff structure. The Ife Economics Department seems to put considerable weight on the comments of external examiners in evaluating teaching performance. For promotion from lecturer II to lecturer I, teaching performance is the chief criterion. For subsequent promotions research is most important.

3.3. University of Lagos Department of Economics.

The Economics Department of the University of Lagos has a staff establishment of 25. All but two positions were filled at the time of the visit, although five people were on leave. Several people were about to resign (including the Chairman) to take positions elsewhere, and several new appointments were in process, as many as five at the rank of professor and reader. In June 1981 the Department had only one person at the rank of professor and none at the rank of reader. Below the rank of reader, it had nine senior lecturers and 14 lecturers. Most of the lecturers are former students who had been sent abroad for advanced degrees. All of the staff members are Nigerians.

The University of Lagos has a very systematic approach to staff evaluation for promotion purposes. The performance of each staff member is calibrated on a scale of 80 points, of which 35 are allocated to research and publications, 30 to teaching, 10 to qualification, and 5 to university and community service. Of the 35 points allocated to research performance, 30 may be earned for published research and 5 for current research. To be promoted to professor one has to score at least 21 points on published research, for reader 18 points, and for senior lecturer 15 points. To obtain these 15 points one has to have published 6 to 7 articles in good quality journals. The Department Chairman assesses the quality of the published work for promotions up to the senior lecturer level. For promotions to reader and professor, the papers are sent also to outside evaluators. The 30 points available for teaching performance are earned on the basis of length of teaching, one point per year up to 15, plus 10 points for quality and 5 points for teaching load (especially course level, undergraduate versus post-graduate.) The qualification points are given at the rate of 10 points for a Ph.D. and 6 to 8 points for a Master's degree. The only advantage that is apparent in this elaborate process is that it gives the staff member an idea of what counts, but it gives an appearance of objectivity to an evaluative process which is inevitably subjective.

The staff at the University of Lagos Economics Department teach two courses per term, which involves 6 hours of lectures per week plus about 4 to 6 hours of tutorials. Most of the staff do research and publish regularly in both local and international journals. The research is individual rather than by teams. They do also consulting work and contract research for the government and international agencies. In the view of the Department Chairman, consulting and contract research was moderate in amount and did not interfere with academic research.

The University of Lagos has about 350 to 400 students enrolled in economics and has been awarding about 100 B.Sc. (Econ.)'s per year in recent years. This year it is awarding 120 first degrees. Its post-graduate program is rather small. It offers a one-year M.Sc. degree based on course work plus a project. About 10 to 15 students receive this degree each year. It awards also a two-year M. Phil. degree, which has currently five or six students enrolled. The degree itself is new and has not yet been awarded. The M. Phil. is waived for students who continue toward the Ph.D. degree. The Department has so far awarded only one Ph.D., but three students are currently near completion of their Ph.D. program.

The University of Lagos economic program does not emphasize rural economics, but it has a concentration area in demography. Other applied areas of concentration are industrial and labor economics, monetary economics, public finance, and international economics.

.4. Ibadan Faculty of Agriculture - Department of Agricultural Economics.

The two faculties of agriculture that were visited were at Ibadan and at Ife. Both faculties have separate departments of agricultural economics and of extension services. The Department of Agricultural Economics at Ibadan is by far the strongest in the country and in Black Africa. It has a permanent staff of 19 persons, including five professors, four readers, five senior lecturers, and five lecturers. All of the staff members but one have Ph.D.'s and all are Nigerians. The Department has considerable stability; all of the senior people have been there for six years or more. For the last five years there have been very strong outside demands for departmental expertise. Federal and State governments as well as parastatals and international organizations have called upon the departmental staff for consulting services and contract research. The Department has been deeply involved in studies relating to the preparation of the Fourth National Development Plan, which is due to come out by the end of the year. Among the commissioned research were studies dealing with minimum guaranteed prices for certain crops and for livestock, analysis of infrastructure, input subsidies, the production economics of livestock and dairy farming, and the impact of the cooperative movement.

The Ibadan Agricultural Economic staff is deeply involved also in offering in-service programs and workshops for both Federal and State governments. Once a year it offers a six-weeks training program for Federal and State agricultural planners. The program concentrates on the plan objectives and on specific agriculture projects. The participants take field trips to projects and are asked to write evaluations, which are then reviewed as part of the training program. The Department offers also a four-week once-a-year workshop on methods of agricultural data collection and data analysis for planning purposes.

These heavy outside commitments no doubt tend to stretch the available staff time a bit thin. It was indicated, however, that some selection is exercised in accepting contract research by giving preference to the kind of projects that provide also a basis of academic publications. One area which apparently tends to suffer is time spent with post-graduate students. The Department has good facilities and an excellent library, but it lacks a common room where post-graduate students can gather to interact with each other and occasionally with staff members.

The teaching program of the Ibadan Agricultural Economic Department covers all the major areas of the discipline at both the macro and policy levels and the micro, marketing and production levels. The Department teaches also students who wish to specialize in rural and agricultural development. The undergraduate agricultural economic program takes four years for students who leave secondary school at the "A" level and five years for those who leave at the "O" level. This program includes one year of practical farm work. During the first two years of course work all students in the Faculty of Agriculture take the same courses. Of the 38 units of work during the first year, four are economics. During the second year all students take 8 units in extension, farm management and rural economics. Specialization takes place during the final year, during which students specializing in agricultural economics take most of their course in their field of specialization.

Over the last five years, the Faculty of Agriculture of Ibadan has turned out an average of around 50 B.Sc.'s in agricultural economics per year. Recently the number has been increasing. The current third year has 55 students. Some 60 students have been accepted for the entering class of next fall out of 80 applications. There is a strong demand for training in agricultural economics, which is a response to excellent job opportunities for graduates in both the private and public sectors.

At the post-graduate level the Ibadan Department of Agricultural Economics offers an M.Sc. degree, which requires one year of course work and a project paper; an M. Phil. degree which takes two years including a research thesis, and a Ph.D. degree. All of the post-graduate degrees involve course work. Ibadan has the largest post-graduate program in agricultural economics in the country. It awards around 25 M.Sc.'s, 6 to 10 M. Phil.'s and an average of 4 Ph.D.'s per year. The M.Sc degree is very popular. Most of the candidates in the program are sponsored by their employers. Those who are not sponsored are supported by the Department as teaching assistants.

3.5. Ife Faculty of Agriculture - Department of Agricultural Economics.

The University of Ife Department of Agricultural Economics is much smaller than its Ibadan counterpart. It has eight permanent staff members: 2 professors, 2 senior lecturers and 4 lecturers. All of the staff members have Ph.D.'s (5 from the U.S. and 3 from the U.K.) and all are Nigerians. The Ife Department concentrates mainly on undergraduate training. The overall structure of the undergraduate program is similar to that at Ibadan, although there is a less wide selection of courses available. During the current year the Ife Department has only 13 students in the final year of agricultural economics, but some 80 have been accepted for the coming year.

Both Ife and Ibadan have departments of agricultural extension. This is not a very popular field with students. In each case only a few students receive degrees in this area each year. The extension departments teach also rural sociology, which is another area of limited attraction. Students trained in rural sociology, unlike students trained in agricultural economics, do not have many employment opportunities.

3.6. The Nigerian Institute of Social and Economic Research (NISER).

This is the most important institution in Nigeria for applied research in the social sciences. NISER has been in existence for some 30 years (from 195) to 1960 it was known as the West African Institute for Economic and Social Research.) Until 1977 it was closely linked to the University of Ibadan, where it is physically located. Since December 1977, NISER is an autonomous Institute. It will move off the Ibadan campus to a nearby location when its own facilities will be completed. The functions of NISER have been defined by the Federal Government as follows:

(a) to provide consultancy services to the Federal and State Governments, their agencies and other organizations, in the field of economic and social development

(b) to conduct research into the economic and social problems of the country with a view to the application of the results thereof

(c) to organize seminars and conferences on problems of economic and social development in the country

(d) to cooperate with Nigerian Universities, research institutes and institutions, in the mobilization of the country's research potential for the task of national development and dissemination of research findings for the use of policy makers at all levels.

To carry out these functions NISER is organized into five divisions dealing with:

(1) agricultural and rural development

(2) economic planning and development

(3) physical planning and development

(4) social development, and

(5) business and industrial consultancy.

This last division, which was originally established in 1972 has had the most rapid growth in recent years. It started with an office in Lagos, close to the Federal Ministries which are its chief clients. In 1977 a second consultancy unit was established in Ibadan, and there are plans to expand eventually to all areas of the country.

At present NISER has a professional staff of around 50 persons, not including research assistants. Of this number, about 20 are attached to the two consultancy units and are mainly concerned with feasibility studies and project evaluations. NISER claims to have been involved in one way or another in the development and evaluation of every major project in the country. It has a respectable list of publications and consulting reports to its

credit. Almost all of its work has a very applied character.

Agricultural and Rural Development is not currently one of the stronger areas of NISER; the division lost recently its senior person. It still has two Ph.D.'s in agricultural economics but the remaining four staff members are of junior rank or on study leave. A major preoccupation of the Division in the past has been the cooperative movement in Nigeria. Current plans involve a study of the economics of the production of selected food crops and a study of artisanal fishing.

Aside from its research and consultancy contributions, NISER has played a significant role in the past through the organization of important conferences and workshops on national policy issues. The most recent conference took place in June 1981. It dealt with social science research priorities for national development in Nigeria. This is a rather appropriate topic, since it comes at a time when NISER is getting a new Director (Prof. Diejamaoh is replacing Prof. Onitiri, who resigned last year.) Among the papers presented several dealt with agricultural and rural development.

3.7. The University of Lagos Human Resources Unit.

At the University of Lagos there is a research organization called the Human Resources Unit. It has a permanent research staff of 10 persons: 2 professors, 1 associate professor, 3 senior lecturers, 2 lecturers and 2 junior research fellows. All but 2 or 3 of the staff members have Ph.D's. Until now the Unit has been concerned mainly with urban studies, particularly in relation to Lagos. The Unit is now in the process of reorganization, which will extend its work into rural areas. This is an extension of the work in demographic and manpower analysis. The plan is to undertake an analysis of rural manpower needs and resources in Ondo and Gongola States. Most of the funding of the Unit comes from Lagos University. Some support comes from contract research. Much of the contract work has been done for the National Manpower Board.

4.0. Concluding Remarks.

Nigeria is the only country in Africa with strong graduate programs in economics and agricultural economics. The country has also four well established undergraduate programs in agricultural economics. Large numbers of students are turned out each year with degrees in economics and agricultural economics. Yet the country suffers from severe shortages in these disciplines. The country has established leaders in the social sciences and has a strong national will to use them in preference to expatriates whenever possible. This does not imply that the available manpower resources are always effectively employed.

Chapter 7

S U D A N

1.0. Overview.

In terms of per capita income, the Sudan is among the poorest countries in Africa. In terms of geographic space, it is the largest country of Africa. It has a population estimated to be between 16 an 20 million. As in most developing countries, agriculture plays a crucial role in the country's economy. Available estimates indicate that agriculture provides 38% of the Gross Domestic Product, 95% of the value of exports, 50% of government revenues, and employment for the overwhelming majority of the population. The Sudan is fortunate in that it still has large reserves of unutilized arable land. It is estimated that less than 10% of the arable land is now under cultivation.

Until now the dominant strategy of Soudanese agricultural development has been to focus on big projects, of which the Gezira project is the most outstanding example. This strategy has served the government well in the sense that it has generated much needed foreign exchange and governmental revenue. On the other hand, it has led to a marked dualism between a relatively high income irrigated and mechanized rainfall farming sector, and a very low income traditional agriculture and livestock sector. Corresponding to this sectoral dualism there is a regional and hence ethnic imbalance of incomes, amenities and government services, which has important implications for long-term social and economic stability.

Some 90 percent of the irrigated and mechanized agriculture is located in East Central Sudan, while the West and South of the country are dominated by traditional peasant agriculture and livestock raising. This unbalanced development is not an intended result of governmental policy, but the outcome of measures taken in response to pressing needs for revenue and foreign exchange. In recent years, the Government has initiated measures to redress the imbalance. There has been an expansion of smallholder irrigated agriculture along the Nile in Northern Sudan. For the Western Sudan, a major complex of projects is being researched and planned. The implementation of these projects will mark an important new departure in the agricultural development of the country. This new direction is reinforced by the administrative and planning decentralization measures which have been introduced during the last few years. The current economic plan (1977-83) has introduced a mechanism for regional planning, which is intended to generate project ideas and proposals at the local and regional level.

These new departures have important administrative, planning and research implications. There is great need to decentralize the administrative apparatus and to build up a regional planning capacity that can respond to local needs, conceptualize integrated regional development projects, and effectively communicate these to the central planning and decision-making authorities. With regard to agriculture specifically, there has been a shift in orientation from the past focus on research and development programs oriented toward the modern agricultural sector toward programs designed to increase the productivity of the traditional sector.

Because of the widely varying ecological and cultural conditions in subsistence agriculture and pastoralism, the problems of increasing output and productivity are more complex than in the modern sector. The ILO report of 1976 notes that: "The appropriate institutions and staffing for the development of traditional agriculture pose difficulties. It must be recognized that training, research, and the focus of attention must be different from the present approaches of ministries of agriculture in most countries". What the Sudan needs, and does not have at this time, is a mechanism for generating multidisciplinary teams for rural development to meet the needs of specific regions. Large numbers of well-trained people are needed if the approach is to have a significant impact.

The required technical advice and service cannot be delivered until an agricultural technology appropriate to regional ecological and cultural conditions has been worked out. Results cannot be achieved until a better service infrastructure is developed, especially with regard to feeder roads, transport and storage facilities, and credit.

2.0. The Demand for Uses of Rural Social Scientists

The Sudan is equipped with a rather large number of institutions concerned with various aspects of agriculture who employ rural social scientists, mainly agricultural economists. Besides the Ministry of Agriculture and the Ministry of Planning there are a number of public bodies and corporations which employ these professionals in various administrative, planning and research capacities. Included among those institutions are the National Economic and Social Research Council and the Agricultural Research Council, both of which are part of the National Research Council, the Mechanized farming Corporation, the Development of Western Sudan Agricultural Research Project, the Land Use, Soil Conservation and Water Programming Project, the Pasture and Range Management Administration, the Gezira Board, The Blue Nile Integrated Agricultural Development Project, the Agricultural Research Corporation, the Desert Encroachment Control Program, and the Agricultural Development Bank. Aside from the research institutions, most of these organizations employ people trained in the social sciences in administrative, evaluation and monitoring tasks. None of the ministries is set up for long term fundamental analysis or major project preparation. Major projects are almost invariably farmed out to foreign consulting firms who often add local consultants to their teams.

2.1. The Ministry of National Planning.

This Ministry has around 190 university trained professionals on its staff. About 170 of them are economists. Seven have a B.Sc. in agriculture, and the rest are trained mainly in administration and law. Most of these people are trained only to the B.A. or B.Sc. level. It was not possible to establish how many people in total there were at the Master's level, but it was indicated that there were five persons with M.Sc.'s in agricultural economics. The Ministry has now

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five Ph.D.'s, four in economics and one in agricultural economics. It used to have 15 Ph.D.'s, but was not able to keep them. The reason given in Government is that it cannot compete with salaries and terms of service offered in the Arab oil countries, or by local consulting firms and international organisations. The reason given in academic circles is that the ministries are not set up to use the skills of Ph.D. level economists, that such people have no opportunities to use their professional skills in a rewarding manner. Aside from not being able to retain the most highly trained people, the Ministry of National Planning suffers from considerable turnover at the Master's level. It recruits between 10 and 15 graduates a year and on the average sends 7 to 8 abroad for training to the Master's level. Once they return from abroad with a Master's degree, it is difficult to keep them more than a couple of years. They often quit governmert work, even though they are obliged to work for the government or reimburse the training costs. In practice it has been very difficult for the Government to collect repayment of training costs.

The reasons given for sending people abroad rather than to the University of Khartoum for the Master's degree are rather interesting. It was said that although the cost is higher abroad, the time required to get a degree is less, because abroad the student is free to study, while at home he is burdened with many family responsibilities that interfere with his studies. Another reason given is that the possibity of being sent abroad for an advanced degree is the main drawing card the Ministry has in getting some of the brighter graduates. Without that balt they could not recruit the kind of people they would like to attract. Another reason advanced was that it is very important for future professionals within the Ministry of National Planning to have been exposed to the world outside of the Sudan. Many of the Ministry's professional people have to deal with foreign consultants, and it is important to know how foreign trained people conceptualize and analyze problems. Finally, it was said that the University of Khartoum could not train all people at the Master's level that the government needs, although the factual basis for this view was not supported. In general, University of Khartoum trained people were said to be well trained in theory but had not sufficient grasp of practical problems. A special introductory in-service training program would be very useful but is not available at this time.

The Ministry of National Planning has five major departments in which economists are employed:

(1) The Administration for Sectoral Plans and Budgets, which has five sectoral offices for agriculture, industry, transport, services, and power, and a general budget office. Each of these offices employs about seven economists;
(2) The Loan Department, which employs about 15 economists;
(3) The Regional Planning Department, which employs about 12 economists;
(4) The Project Preparation Unit, with 15 economists; and
(5) The General Plan (Macro Planning) Unit, which has 10 economists

Representatives of the Ministry indicated that turnover, especially of experienced people, is their major staffing problem. They believe that the staff should be larger, but if all the people stayed with the Ministry, the situation would be well in hand.

From the Ministry's point of view, staffing needs are not so much a question of numbers as a question of quality. It was confirmed during discussion that the professional staff of the Ministry has very little time for basic economic analysis of long term problems and that for major projects the Ministry depends on foreign consulting firms. The employment of well established international consulting firms is very often part of the financial agreement on externally financed projects. Ministerial staff and sometimes local consultants are used to review and evaluate the studies prepared by external firms.

In response to an inquiry about in-service training needs it was indicated that the biggest need was in English language training. Many of the Ministerial employees, even university graduates, suffer from inadequate ability to express themselves in English. Although Arabic is the official language, English is used in communications with the South of the country and very widely in technical and external communications. Another area of in-service training which is contemplated at this time is for planners at the provincial level. The regional planning apparatus is not yet functioning. Most planning units at the provincial level are still in the process of being organized. The Ministry of National Planning intends to bring these regional officials to Khartoum for a three-week in-service training program, which will be organized with the help of the University. Another aspect of on-the-job training of economists relates to their role as counterparts to expatriate planners. The Ministry has five planners from UNDP financed by the World Bank. The method of learning-by-being a counterpart has not been successful. But the expatriate experts are now organizing a series of seminars and workshops for the local staff.

2.2. The Ministry of Agriculture (MoA).

In the Ministry of Agriculture the staffing problem is similar to that in the Ministry of National Planning. The MoA has lost some of its most qualified people to Saudi Arabia, the Emirates and Kuweit. During the last two years the MoA has lost 14 experienced people, mostly M.Sc.'s and Ph.D.'s. Most of the agricultural economics staff are located either in the Ministry's Planning Unit or in its Economics and Statistics Department. The Planning Unit has a professional establishment of around 50 people at all levels, but there were only 1 Ph.D., 2 M.Sc.'s and about 20 B.Sc.'s in residence. About 12 people are abroad working toward advanced degrees and others are on secondment abroad or to international organizations. The Economics and Statistics Department has a current residential staff of 2 Ph.D.'s, 4-5 M.Sc.'s and about 20 B.Sc.'s. Most of the professional activities in the MoA are of the day-to-day routine kind, including collection of crop data, projection of yields, evaluation of projects prepared by consultants, and monitoring of project execution. The Planning Unit does very little analytical work, although occasionally it prepares small projects. For this kind of internal project preparation it has relied on an FAO team. It used to have four FAO experts, but there is only one left. The FAO has helped for 20 years to train statistical counterparts but the MoA keeps losing them once they are trained.

During the last five years the MoA has not put together a sectoral plan for agriculture, but it is now getting ready to do so. The main problem is one of coordinating the regionally generated proposals and projects. The links between the people who plan in regions and the planners in the MoA have not yet been worked out. For important projects the MoA looks to external consultants. A recent project, called the new Halfa, is being done by Agrargeotechnik, a German firm, and the rehabilitation project for the Gezira is being undertaken by Euroconsultants. The MoA is not equipped to undertake micro level research into farming systems. A project of this kind, however, is done by the Economics and Social Research Council, which uses mainly local talent.

People who are familiar with the Soudanese agriculture planning are critical of lack of coordination at the regional level. Typically, proposals at this level are done piecemeal by separate agencies concerned with different issues, such as roads, water supply, crops, pasture, forestry. There is no integration, no team work, and no agency concerned with the overall conceptualization of integrated rural development. Not enough attention is paid to the coordination of projects with reference to timing and spacial dimensions. Each technical department has its own program and projects, which are brought separately for review to a technical committee at the provincial level. At the provincial level, projects are assembled but not integrated. It was pointed out that this is not so much a manpower as an institutional problem, although apparently the top planners do not fully appreciate the need for an integrated approach at the micro level.

2.3. Parastatal Corporations

Agricultural Economics has so far had only a limited impact on agricultural research, which is the responsibility of the Agricultural Research Corporation (ARC). The ARC introduced a small agricultural Economics research unit a few years ago in one of its research stations with 2 M.Sc.'s in agricultural economics and one Ph.D. in statistics to work with agricultural scientists. They have cooperated on the economics of crop response to fertilizer, the economics of fertilizer allocation and farm management. This work has not been pushed very far. Agricultural economists are looked upon as very junior partners in the much more solidly established agricultural research community.

Agricultural economists and other rural social scientists do not play a very prominent role either in public corporations like the Mechanized Farming Corporation (MFC). This organization is responsible for the mechanization of the rainfed sector of agriculture, especially where heavy soils prevent effective cultivation by manual labor. At this time the MFC does not have a single agricultural economist in place, although one is abroad for training. The managing director, who is an agriculturalist, has indicated that he needs an agricultural economist for the Corporation's planning and development unit, mainly to prepare reports for the World Bank.

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Given the fact that this is now the most dynamic sector of agriculture in the Sudan and given the wide range of activities (clearing, supervised farming, credit management, provision of feeder roads, water supply, direct operations of mechanized farms) in which the corporation is engaged throughout a broad streak of land across the middle of the country, there should clearly be a need for considerable amount of socio-economic research. For this kind of work the MFC hires external experts and consultants. The Corporation has currently 1.2. million dollars at its disposal from the World Bank for this purpose. It can hire either Sudanese or foreign consultants. It can even hire Sudanese consultants who are outside of the country at international market rates, although this procedure has led to considerable difficulty. What the Corporation cannot do is to hire highly qualified local consultants under the rates prescribed by the Sudanese Government. So for the most part the MFA relies on international, non-Sudanese consultants to carry out the needed studies. At the moment an important study is being done by the World Bank on a 5000 acre farm to develop a new farming model in formerly nomadic pasture land in Southern Darfur province.

These illustrations indicate that the use of external consultants in African countries does not necessarily reflect the extent of the shortage of local talent and experience. Sometimes there are institutional and economic barriers to the employment of local high level manpower. Available people who cannot be employed at home, then become external consutlants in other countries.

3.0. Training and Research

3.1. University of Khartoum Department of Economics.

The main center for teaching economics in the Sudan is the Department of Economics located in the Faculty of Economics and Social Studies at the University of Khartoum. This is a well regarded department inside and outside the University. Its main strengths in terms of staff are in the areas of economic theory, development economics and monetary economics. The Department puts considerable emphasis on quantitative analysis and econometrics. This orientation whould enable them to turn out students with a good analytical foundation for work in the macro/monetary areas. These are the areas in which students prepare honors degrees. The areas which the Department would like to strengthen are regional economics, public finance, micro theory and applied micro theory.

The economics Department has an establishment of 26 staff, but only 15 of them are currently in residence. Among these 15 there are 3 professors, 5 associate professors and 7 lecturers. All of them are Soudanese and all but one or two of them have Ph.D. degrees, mostly from well known foreign universities. The Department actually lists more staff on secondment elsewhere, mainly in the Arab oil countries and in international organizations, than it has currently in residence. A staff member can be on secondment for four consecutive years, even five with special permission, without having to give up his university post. On secondment a staff member usually can earn 3 to 4 times his university salary, unless he is seconded to a post in the Sudanese Government.

These secondment practices account for a rather high rate of turnover and limited university experience among the staff. The average staff member has about 3 to 4 years of experience in university teaching and research in Khartoum.

The Department and the University expect staff members to be actively engaged in research, but it was not possible to get any quantitative dimensions of the overall research efforts. There is no organized research program in which staff members work together in teams. As in most economics departments, research projects are individualistic and are based on the personal interests of individual staff members. Promotion within the Department is based on either length of service, or research and service, up to the associate professor level. For further advancement a more substantial research record is required. Most people in the Department publish their research in the Sudan Journal for Economic and Social Studies as well as in the foreign journals. About one-third to one-fourth of them are also regularly involved in outside consulting. At this time the Department is discussing a proposal to create a university consultancy service which would get consulting contracts and draw on the service of university staff.

The Department of Economics is the largest department in the Faculty of Economics and Social Studies. It offers two four-year degrees, one in straight economics and one as a joint degree with other departments. On the average each graduating class has about 60 students in straight economics, 110 to 120 in the joint economics-political science degree and 40 in the economics-anthropology degree. In addition, the Department offers a five-year honors degree in economics which produces 15 to 20 degrees each year. At the postgraduate level the Department offers a research M.Sc. Econ. degree, which turns out about 6 to 8 degree holders a year, as well as a joint M.Sc. degree in Development Planning with the Development Studies and Research Center. This latter degree involves post-graduate courses taught at the Center, but reportedly the degree itself has not yet been finally approved by the University Senate. There are four students enrolled in this program during 1980-81, and the intention is to expand the enrolment to around 18 for the coming year. The Department of Economics offers also a Ph.D. degree based on supervised research rather than courses. This degree usually takes 3 to 5 years to complete after the M.Sc. degree. About 1 or 2 Ph.D.'s in economics are awarded per year.

Mention should be made of the fact that there are economics departments at Gezira University and Juba University. In both instances the departments are very recent and have small staffs (3-4 persons and small enrolments (15-20 students).

3.2. Faculty of Agriculture-Department of Rural Economy

Agricultural economics is taught in the Department of Rural Economy located in the Faculty of Agriculture, University of Khartoum at Shambat. This Department has an establishment of nine posts, of which two are filled by professors and the others by lecturers. One of the professors is currently on secondment in Kuwait, and two of the lecturers are studying abroad.

In addition the departments lists 10 teaching assistants with B.Sc.'s, all but one of whom are on study leave abroad preparing an M.Sc. degree. All of the staff are Soudanese and 7 of them have Ph.D. degrees, mostly from the United States. On the whole this looks like a fairly solid department. The staff members have a strong publication record. At the undergraduate level, the first three years of study are the same for all agriculture students. They concentrate mainly on agricultural courses, although during the third year all students take two courses in agricultural economics. During the fourth year all students take courses in Land Use, Rural Sociology and Agricultural Extension, Biometrics and Experimental Design, and Farm Management. Beyond these common courses the fourth year students may select one of eight options covering different specialized areas. One of these options is Agricultural Economics and Farm Management. To complete this option they take six courses in (1) Introduction to Econometrics, (2) Development Planning, (3) Farm Management, (4) Agricultural Policy, (5) Rural Sociology and Agricultural Extension Policy, (6) Biometrics and experimental Design. The program is designed more to meet the needs of large scale agriculture rather than smallholder farming or the transformation of subsistence farming. There are about 30 to 40 students per year getting their B.Sc. with a specialization in agricultural economics.

For the last three years the Department of Rural Economy has been working on the introduction of post-graduate courses for the M.Sc. degree. Six semester courses have been proposed for this program, including: (1) Mathematics, Statistics and Econometrics for Agricultural Economics, (2) Economics of Agricultural Production, (3) Theories of Macro-Equilibrium, (4) Agrarian Development and Planning (5) Communication and Social Change, (6) Administration and Supervision of Extension. The course descriptions indicate a rather theoretical and sophisticated approach, which is again mainly oriented toward policy analysis and large scale farming. This program still awaits final approval by the University Senate, although some of the courses have been taught. In the meantime, the M.Sc. and Ph.D. degrees remain based on supervised research. Currently there are 27 students enrolled for the M.Sc. degree and 1 for the Ph.D. in agricultural economics.

In addition to the proposed post-graduate courses, the Department of Rural Economy has proposed the creation of a B.Sc. Honors degree in Agricultural Extension and Rural Sociology. Such an option was offered by the Department during the 1969/70/71 academic years but was discontinued for lack of adequate staffing and resources. It is fairly obvious that such an orientation in the program would be quite valuable, but the Department would need at least several more staff members to carry it out. There is no indication that the required resources will be made available.

3.3 University of Khartoum-Development Studies and Research Center (DSRC).

The Development studies and Research Center is concerned with both teaching and research in the development field. The Center was specifically created (in 1976) to encourage interdisciplinary teaching and research in development studies.

Until now, the emphasis has been more on the teaching than the research side. The Center teaches only post-graduate students. It offers two post-graduate Diplomas, one in Regional Planning and Rural Development (RPRD) and one in Development Studies. The Completion of the diploma takes 12 months, including one month of field work. In addition, the Center offers a two-year Master's degree jointly with the Economics Department. The Diploma in Development studies is open to University Graduates with the relevant background, but the Diploma in Regional Planning and Rural Development is specifically intended as an in-service training course for persons already employed by the Government. This program is supposed to train officers for regional planning, but regional governments so far have not sponsored any students. The RPRD program has the support of an interdisciplinary team provided by the Institute of Social Studies (ISS - The Hague) and financed by the Dutch Government. During the one month of field work the students are introduced to a multidisciplinary field survey approach.

The teaching program of the Center has only recently gotten off the ground, and there seems to be some question about its future. On paper, at least, the courses of the RPRD program are well suited to the needs of the country. The training involves a case study approach which focusses on a specific part of the country where the field work is done. Apart from the visiting staff from the ISS, of whom there were five last year, the Center does not have a staff of its own. It has to rely on cooperating staff from the Departments of Economics, Political Science, Anthropology, and Business Administration. During the past year there were 12 such cooperating staff members. The participation of these staff members is in addition to their regular university duties, and they get paid a fee for teaching at the Center. There are no funds available for research, so there is no cooperative research program.

The following table gives the enrolments for 1980/81 and the intended enrolments for 1981/82

TABLE I

Enrolment in the DSRC Degree Program

Program	1980/81	Projected 1981/81
Diploma in Dev. Studies	13	12-15
Diploma in Reg. Planning and Rural Dev.	10	12-14
M.A. in Dev. Planning	4	8-10
Total	27	32-38

The realization of the projected enrolment depends only in part on Government sponsorship. The Center has a number of scholarships made available through foreign aid, mainly Dutch and some British. The Dutch financial commitment to the Center is on the order of one million guilders per year for 3 years.

3.4. The National Council for Research.

The major research sponsoring and coordinating organization in the country is the National Council for Research. It has four divisions: (1) the Economic and Social Research Council (2) the Agricultural Research Council, (3) the Medical Research Council, and (4) the Science and Technology Council. The National Council for Research is an independent governmental body whose president has ministerial status and reports directly to the President of the Republic. Each of the four divisions has its own board of directors and a standing committee on research projects. This committee decides on research priorities, based on the current national Economic and Social Plan. The committee seeks to support the objectives of the Plan and to deal with issues that are of importance to the planners.

For the Economics and Social Research Council (ESRC), the major current emphasis is on the socio-economic impact of development on rural areas. Currently researched subjects include: the impact of the oil discoveries in the country on regional development, an analysis of the impact of internal and external migration on both rural and urban development, general socio-economic surveys of particular areas such as the Wadi Halfa area innundated by waters behind the Aswan dam, a survey of the area of the Blue Nile Integrated Development Project, a socio-economic survey of the Jonglei area where a canal is being built along the White Nile, and a comparative analysis of the role of women. For these studies the ESRC cannot rely on its own staff. It has a research staff establishment of 34 persons, but of these there are 29 on study leave preparing M.Sc. or Ph.D. degrees. The ESRC depends for the time being on outsiders. To that extent the ESRC is a coordinating body which puts together research teams and provides them with logistial support. Many of the outsiders come from the University and various research bodies. The head of the ESRC feels that he can get local professionals for most of the research jobs, although the manpower resources are a bit overstreched at present. On the other hand, there are vast research areas that remain untouched. Most of the research has been in support of the big agricultural irrigation schemes. The traditional subsistence farming sector has hardly been touched, and no applicable development models for this sector have been produced. With the new emphasis on regional planning and grass roots development, it is expected that more research emphasis will be put on the traditional rural sector. The ESRC finances only part of the research it organizes. It receives also commissions from the government and from international organizations.

4.0. Concluding Remarks

The Sudan is reasonably well provided for with training and research institutions in the social sciences. The country turns out fairly large numbers of people with degrees in economics, agricultural economics, and related disciplines. There are shortages nevertheless, mainly because of heavy drains of trained manpower to the wealthy Arabic speaking countries. Shortages in the rural social sciences will be felt even more strongly as the country begins to make major efforts to transform the traditional rural sector. There is evidence of underutilization of available social science resources, partly as a result of heavy reliance on expatriates and partly as a consequence of inadequate organization, especially at the regional level.

Chapter 8

TANZANIA

1.0. Overview.

Agricultural and rural development occupy a pivotal position in Tanzanian thinking and planning. The official development strategy, following the Arusha declaration of 1967, stresses national independence and self-reliance. To achieve these objectives the Government is aiming at a fundamental transformation of the economy, toward self-sufficiency in food production and maximum use of indigenous resources. The strategy envisages also administrative decentralization and grass roots participation in the development effort. The rural population, which represents the overwhelming majority of the country, is deeply involved in this transformation which relies on the mobilization of the productive energies of the masses.

This ambitious structural transformation has far-reaching implications for the life and productive activities of the rural population. For the transformation to be carried out in a manner which benefits the masses and minimizes the cost and strain of change, a sound understanding of the rural economy and society is required. This need is well understood in general terms in Tanzania. So far, however, more effort seems to have been expended in delivering the messages of the Government than in trying to understand the peasants' response to them. There is now an increasing realization among officials that one of the reasons policies have been less successful than hoped for has been inadequate base-line information and insufficient attention paid to the socio-economic dimensions of agricultural and rural policy. This awareness is leading toward some important new undertakings in socio-economic research related to agricultural development. An overall strategy for developing and improving the country's high level manpower resources in the social sciences commensurate with the felt needs has not yet emerged.

2.0. The Demand for and Utilization of Rural Social Scientists.

It may be worthwhile to begin with a quotation from the Tanzania Agricultural Sector Manpower Study (1979)

> "Many explanations have been put forth to explain why most farmers in the nation have not altered their management decisions (to accord with the Government's wishes) about what to produce, how to produce it, how much, when and where. These explanations range all the way from the suggested inadequacies of extension agents to lack of road maintenance and low cost transportation facilities, not to mention poor training, insufficient research studies, lack of ministry support, lack of trained planners, insufficient roads, unclear organization structure...
>
> Those knowledgeable about the micro-economic situation in Tanzanian agriculture seem to agree on one point. For most of the country there is an absence of technically feasible and economically viable recommendation packages to communicate to farmers. Even if there were good roads, prices, marketing arrangements, inputs

knowledgeable extension personnel, adequate transport for supervisory personnel, proper work programming, and so forth, many farmers would still not change their practices. The absence of opportunities for making a surplus for the smaller farmers appears to be the single most important factor underlying the long term downward trend in agricultural production and productivity." (TASMS, Vol. I, pp 6-7).

This central theme of inappropriate recommendation packages was encountered many times during discussions in Tanzania. It was pointed out that there was insufficient understanding of the farmers' practices and of the motivations behind them.

2.1. The Ministry of Agriculture.

In discussions at the ministerial level, more emphasis was put on the more immediate concerns of senior officials, which have to do with agricultural macroeconomics rather than farm economics.

The Ministry of Agriculture feels that it has an insufficient number of agricultural economists to staff properly its Marketing Development Bureau (MDB), which is concerned mainly with analysis of markets and prices, and its Project Preparation and Monitoring Bureau (PPMB). At the moment the MDB has 15-18 people, but apparently only a few of them have post-graduate training in economics. The MDB has support also from the FAO. The PPMB is a very important group for budgetary and project analysis, but it has only 8 persons and is stretched much too thin. In addition, the Ministry would like to see agricultural economists assigned to each of the 10 major parastatals (coffee, tea, cotton, tabacco, cashews, sisal, National Milling Corporation...) for which it is responsible. Finally, with regard to the micro-economics of production, the Ministry would like to see agricultural economists trained in the analysis of farming systems in a special farming systems research unit. At present there is no sociologist in the central offices of the Ministry of Agriculture, although there may be some in the regional offices. There is a rural sociologist who is advisor to the President.

2.2. The Ministry of Livestock.

The Minister of Livestock indicated that he needs more economists, but economists who have a background in livestock development, which is the main concern of the Ministry. The chief need is for people who can prepare and monitor livestock and dairy projects. In the view of the Minister, there should also be people with such training in the central planning office, in order to improve communication and mutual understanding. At the moment the Ministry has two FAO economists, one in livestock and one in dairy farming. These people are supposed to give on-the-job training to three young graduates in economics. The Minister does not consider a B.A. in economics an ideal background for the kind of people he needs. He prefers to have people with a B.Sc in animal science and an M.Sc in agricultural economics with a specialization in livestock or dairy economics. The Minister would also like to see one livestock economist in each of the three research institutes under his jurisdiction, and he would like to have one economist and one sociologist attached to each major development project. Finally, the Ministry has staffing needs in its four training institutes, two of which give certificates and

two award diplomas. At present these training institutes do not teach either economics or sociology and as a consequence turn out "mere technicians". Overall the Ministry gives preference to training at the M.Sc level, although "it would not be a bad thing to have a few Ph.D.'s", the Minister observed.

2.3. The Ministry of Planning and Economic Affairs.

The Ministry of Planning has agricultural economists in a special agricultural planning unit in the department of sectoral planning. The unit started only last October and so far has only two agricultural economists. It should expand to about 5 professionals. The Ministry needs also agricultural economists for its livestock planning unit. This unit is unstaffed, but the Ministry is trying to recruit an expatriate expert. Like the other ministries, the Ministry of Planning stresses the need for more agricultural as well as more general economists. At present the Ministry of Planning has altogether 26 economists, about 90% of whom have M.A.'s. It has also a supporting staff of 20 B.A.'s in economics and statistics.

The Ministry of Finance indicated that for its purposes it has no need for agricultural economists.

2.4. The Tanzanian Agricultural Research Organization (TARO).

A major new source of demand for agricultural economists as well as sociologists comes from the recently created Tanzanian Agricultural Research Organization. Its Director reported that in 1979 and 1980 two National Agricultural Conferences were held at Arusha that brought together research officers, regional development officers and representatives of the leading corporations concerned with agriculture. After heated debates between agriculturists, who found fault with extension work, and extensionists, who said they had nothing to extend, it was agreed that the basic problem was inadequate knowledge of farming systems. What needs to be better understood is the ways in which a farmer utilizes his land, his time, and his implements in a particular environmental and cultural setting. One needs to understand "why a farmer does what he does."

TARO has decided that its first research priority should be the documentation and analysis of farming systems for the whole country. The country has been divided into five major ecological zones, each presumably corresponding to a major type of farming system. Each zone will obtain a zonal farming systems center, using existing agricultural research centers. Each zonal center will be staffed by one agricultural economist, one sociologist, one anthropologist and one documentalist. These social scientists will be working with 15 agricultural economists who will be making studies all over the country supported by a sizeable number of research assistants. The Ilonga Training Institute will be converted into a Farming Systems Training Center to train the local manpower needed for the farming systems analysis.

External assistance for the exercise is to be provided initially by USAID with the cooperation of Colorado State University. This is a very ambitious undertaking, which will require substantial time, money, and personnel, both for research and training. It will be a new and major attempt to deal with what has been recognized as one of the chief shortcomings of past approaches in agriculture. It is an attempt which puts the social sciences in the forefront to provide needed support for the utilization of the results of classical

agricultural research.The success of this farming systems approach will depend in part on the capacity of the people provided by Colorado State. It may well be that the people they provide will be well trained but lacking in local experience, which will require on-the-job learning.

3.0. Training and Research.

Training in the social sciences related to agriculture is done for degree candidates at the University of Dar es Salaam, including the Faculty of Agriculture at Morogoro. For non-degree candidates training takes place at a number of specialized institutes under the Prime Minister's Office and the Ministries of Agriculture and Livestock. In addition, there is the Institute of Development Studies under the Ministry of Manpower Development. This multitude of institutions puts a strain on the system. They compete with each other for a limited number of available teaching staff as well as a relatively small pool of secondary school leavers interested in agricultural studies.

The Tanzania Agricultural Sector Manpower Study (1980) gives the following data on the number of people trained in agricultural economics who were employed by all "end user organizations of agriculturally specialized manpower."

Level of Training:	Number:
Certificate:	119
Diploma:	155
B.Sc.:	52
Master's:	24
Ph.D.:	2

The organizations covered included ministries at the central and regional levels, parastatals, university and research institutions, as well as private organizations. Even if one allows for a fair number of errors and omissions, the supply of trained people in agricultural economics remains very small, especially at the advanced level.

3.1. The University at Dar es Salaam.

The University offers courses related to agricultural and rural development in the Departments of Economics, Sociology and Geography. In addition, the Institute of Development Studies offers an inter-disciplinary course in development required of all students. Some Tanzanian officials expressed the view that every student, regardless of discipline, receives training in rural development. Undergraduate students in the Department of Economics at Dar es Salaam may follow a substream in Agricultural and Rural Development during their second and third years. As part of this curriculum, they take the following agriculturally oriented courses:

- Rural Development and Agricultural Economics
- Tropical Agriculture and Farm Management
- Agricultural Marketing

and they may take also

- Socialist Agricultural Systems, and
- Rural Development Strategies.

Not all of these courses are offered every year, partly because of staff limitations and partly because of the small number of students interested in studies related to agriculture. Of a total annual intake of around 60 students in economics only about 10 would opt for the Agriculture and Rural Development substream.

In recent times the Department of Economics has sought to upgrade the program in theory and quantitative methods, but it is limited in this attempt by the relatively weak mathematical preparation of the incoming students. Most of the secondary school leavers with good mathematical preparation tend to choose science or engineering as their field of study.

At the MA level, the economics students can follow a stream emphasizing agricultural and rural development, but again there seem to be very few students selecting this option. The total number of M.A. students in economics at Dar es Salaam is around 15 per year. They complete their course work in nine months and the total program including the M.A. thesis in twelve to eighteen months. Staff members indicated that students believe that M.A. studies emphasizing agricultural economics should be done in the Faculty of Agriculture at Morogoro rather than in Dar es Salaam. This belief is consistent with the views of the Ministries of Agriculture and Livestock.

The Ph.D. degree does not involve course work beyond the M.A. level and consists wholly of preparing a dissertation. There have been very few students getting a Ph.D. in economics at Dar es Salaam and probably none in agricultural economics. The Economics Department at Dar es Salaam has currently an establishment of 17 staff and a resident staff of 16. Of the 16 staff members in residence, only 2 are Tanzanians, and the others are expatriates. About one half of the staff have Ph.D. degrees. The preponderence of expatriate staff will be eliminated when Tanzanians presently studying abroad for advanced degrees will return. This assumes they will remain at the University. The Department of Economics has suffered much from staff instability. Expatriates tend to stay for relatively short periods of time, and Tanzanians get enticed into governmental positions. In theory, these are supposed to be mostly revolving positions, with people returning to the University after a determined period of time. In practice, very few people return to the University after a period of government employment. The University staff do some research and are expected to publish in order to get promoted. Their teaching performance is monitored through student course evaluations. The standards for either teaching or research remained unclear but are likely to remain weak so long as severe shortages persist.

The Department of Sociology has currently a staff of 10 and an establishment of 15. This department suffers from some of the same problems as the Economics Department, in the sense that many current sociology staff are short-term expatriate visitors. In sociology, however, there is less pressure from outside job offers. Student interest in rural sociology at Dar es Salaam is even weaker than interest in agricultural economics. The Department of Sociology graduates a total of around 20 students per year. All students have to take a required course in rural sociology during their second year. Of the five options which they may follow, rural sociology is the least popular. "Students have a bias against rural sociology" commented one of the professors. There are about five M.A. students in sociology per year in all areas of specialization. The lack of student interest in rural development contrasts sharply with the official ideology of the country.

3.2. The Faculty of Agriculture at Morogoro.

This Faculty has three divisions: Agriculture, Forestry, and Veterinary Science. The Division of Forestry teaches its own economics and social science courses. The students in veterinary science are offered a course in livestock economics and a course in extension. The Division of Agriculture offers the most courses in the rural social sciences. During the first two years, all undergraduates of this Division follow a common curriculum. During the third year they specialize in one of seven options:

1) rural economy
2) agricultural education and extension
3) crop science
4) animal science
5) soil science
6) food science and technology and
7) agricultural engineering.

Not all of these options are offered every year because there are not enough students. Unless there are at least five students interested in a particular option, it is not offered.

The departments chiefly concerned with the rural social sciences are the Department of Rural Economy and the Department of Agricultural Education and Extension. The Department of Rural Economy has 10 staff positions; 7 persons were in residence and 3 were studying abroad. The Department of Agricultural Education and Extension has also an established staff of 10, of whom 5 were in residence and 5 on study leave. In 1980/81 there were about 10 students who selected the undergraduate specialization in rural economy and none who selected the specialization in agricultural education and extension. It was not possible to obtain exact figures on the number of graduate students preparing the M.Sc degree, but there were very few, at most 2 or 3 in rural economy and none in extension. The Chairman of the Department of Rural Economy indicated that lack of graduate students was a serious problem.

The most striking thing about the social sciences related to agriculture in Tanzania at the University level is the small number of students involved. The reasons given for the small number of undergraduates, apart from lack of student interest, is competition from the many specialized institutes under the auspices of the various ministries. The reason given for small number of students at the M.Sc level is competition from fellowships offered to study abroad. The training component in many aid projects provides for study abroad at the M.Sc level rather than in the country. Whatever the reasons, there is a serious shortage of students in the rural social science at both the graduate and the undergraduate level. So long as this remains the case the country's needs will not be met, and it will be very difficult to build strong programs in this area.

3.3. Specialized Training Institutes:

Although it was not possible to visit the specialized training institutes concerned with agriculture, their importance in the overall training scheme should not be overlooked. They are responsible for a fairly substantial number of certificate and diploma holders, many of whom receive some training in the social sciences. There are altogether fourteen so-called MATI's (Ministry of Agriculture Training Institutes) in the country. Most of these are fairly small but several have space

for over 100 students and one of them (Uyole, Mbeya) has a full-time teaching staff of 61 and places for 500 students. There are presently 2,219 student places in the MATI system. The Manpower Study (TASMS) recommends that these places by expanded by 25% to 2,774 student places by 1987.

Two specialized training inscitutes outside of the MATI system should be noted. One is the Institute of Development Management at Mzumbe, which has a staff of 140 and room for 1155 students. No data are available to show how many of them select rural development,which is an available option. The other institution is a relatively new Institute for Integrated Rural Development and Training at Dodoma on which no information about staff or students was available.

In Tanzania there is excessive fragmentation of the training effort in agriculture. The danger of such fragmentation is duplication, lack of coordination and waste of scarce training resources, which leads to high cost and low training quality. There seem to be no links between the university and these institutes. They do not draw on the university for assistance in the development of curricula and teaching materials. It was reported that some of the MATI staff teach year after year from the notes they took while students at the university.

With regard to future increases in supply, the manpower study endorses the projected growth rates of 3.4% per annum for certificate holders, 18% for diploma holders, and 27% for M.Sc holders. It recommends further that the Government's projected growth rate of 4% per annum for B.Sc holders be increased. This would require that more Form VI entrants and diploma holders be allocated to the Morogoro program. The study recommends also a consolidation of the MATI's so that a minimum size of 320 students is achieved at each location. Furthermore, it recognizes the need for a strengthening of the curriculum and teaching materials of the MATI's.

3.4. <u>The Bureau of Resource Assessment and Land Use Planning (BRALUP)</u>:

In the research area for the fields under discussion the most important institution is BRALUP, which is part of the University of Dar es Salaam. BRALUP is a very high quality institution which has produced well over one hundred research papers and reports in addition to a significant number of consultancy reports. A recent evaluation team found BRALUP to be engaged in policy-relevant work and to have an impact on official thinking and policy-making in Tanzania. BRALUP is in a position to make an important contribution to the research on farming systems to which TARO (Tanzanian Agricultural Research Organization) has assigned first priority. An important criticism of BRALUP, however, is that its research papers have only limited circulation. This may stem in part from a faulty distribution policy, but it is mainly the result of inadequate manpower and material resources. There is, for instance, a serious shortage of paper even to put out sufficient quantities of mimeographed papers. Resources are wasted when research findings cannot be made available to teachers and students as well as policy makers.

The BRALUP evaluation team noted that "the demand for the services of BRALUP exceeds its own resources; consequently there is a tendency to stretch these to the utmost, leaving little room for attention to the crucial issue of staff development." BRALUP has been slow to upgrade its local staff from the M.A. to the Ph.D. level, and the

localization of the staff has been very gradual. In 1970-71 only 4 out of 14 of the academic staff were Tanzanian. By 1978-79 there were 9 Tanzanians among the 15 staff members in residence. Because of this slow progress of the local staff toward the Ph.D, BRALUP, in the opinion of the evaluation team, "is still a fragile plant." In the past, BRALUP has received substantial support from external donors, especially from SIDA (Sweden), and IDRC (Canada), as well as from the U.S., the U.K., Norway and the Netherlands. If it is to achieve full maturity, it will need to continue to receive external assistance for at least another decade.

4.0. Concluding Remarks.

In Tanzania there is a wide gap between a rapidly growing demand for the services of rural social scientists and the ability of the educational establishment to provide the needed manpower. The educational establishment itself remains heavily dependent on external inputs. In the near future a substantial number of Tanzanians are expected to return with Ph.D's earned abroad, but it may be difficult to retain them in the University system. It will not be until many more have been trained that an effective two-way exchange of staff between government and the university can be worked out. And not until university departments (especially in economics and agricultural economics) can count on a stable and capable staff can they develop into mature institutions.

Chapter 9

TUNISIA

1.0. Overview.

In terms of trained manpower as well as training and research institutions, Tunisia is in a favorable position in comparison with Black African countries. Tunisia has a long tradition in professional agricultural education. There has been a professional agricultural school in Tunisia since 1889, although until independence in 1956 there were only 17 Tunisians among the 2000 graduates. After independence the Government expanded the existing two year program of the Institut National de Tunisie (INAT) into a four-year program and created a number of additional research and training programs. As a result, Tunisia has today a relatively strong institutional basis in economics and in the rural social sciences. This does not mean that the country no longer has shortage of trained manpower. A recent USAID document notes that "Agricultural development in Tunisia has and continues to be severely limited by the shortage of well-trained personnel to plan, organize, implement, and manage the many kinds of activities necessary to produce a modern agricultural sector."

In fact, even though Tunisia is fortunate by comparison with Black Africa, it has basically the same agricultural problem. The country is not self-sufficient in food production. It has to import wheat, milk and sugar. In 1979/80 the country imported around 180 million U.S. dollars' worth of grain. Agricultural development has been lopsided in favor of the larger and irrigated units along the coastal regions. Rather little has been done for some one and one-half million owner-operated small farms in the central and southern inland regions. These are semi-arid to arid areas where agricultural problems are approaching a crisis situation. The land resources in these areas have been steadily deteriorating as a consequence of wind and water erosion and overgrazing. Unless prevailing agricultural practices are changed, much of the area is threatened by advancing desertification. This is an area where an integrated multidisciplinary development approach is crucial.

2.0. The Demand for and Untilization of Rural Social Scientists.

Tunisia has benefitted from prolonged efforts of training agricultural economists. The USAID program by itself has trained 35 Tunisians to the master's level in U.S. universities between 1957 and 1980. Of these 35, there are 25 who are now employed in positions of responsibility, mainly in the central and regional offices of the Ministry of Agriculture. Four of the remaining ten are employed elsewhere in Tunisia; three of them have gone back to the U.S. for a Ph.D., and only three have left or not returned to Tunisia after their studies. This record speaks rather well for the country's capacity to hold people trained in this field. There is considerable evidence of strong demand for people with training in agricultural economics in a wide range of governmental, educational and research institutions. At this time the country does not turn out enough people with agricultural economics training to meet the existing demand. One factor which has helped with the retention American trained agricultural economists is the recognition granted to the American Master's degree by the Tunisian authorities.

After some difficulties, most of the master's degrees were recognized to be the equivalent of a French Diplôme d'Etudes Approfondies (DEA). This means that the holder can have the rank of ingénieur principal, which opens the door to the higher levels of the administrative ladder.

2.1. The Ministry of Agriculture

Within the Ministry of Agriculture, most of the agricultural economists of the central offices are located in the Directorate of Planning, Statistics and Economic Analysis. The Directorate itself is divided into three divisions. The planning division is responsible for the planning and coordination of agricultural projects. In addition, this division is responsible for the preparation of the annual economic budget for agriculture. This is a detailed analysis of the previous year's agriculture performance, and a discussion of policy measures and agricultural projections for the coming year, along with statistical information. The statistical projections and the data collection are the responsibility of the Division of Statistics and Analysis. The Division of Equipment Budgets and Project Evaluation is responsible for monitoring and follow-up of agricultural projects. At present all three divisions of the Directorate have only eight agricultural economists among them. Although they have a number lower level assistants (ingénieurs adjoints), they are stretched very thin and are very hard pressed to turn out the kind of sophisticated analysis that is expected of them. They are in fact at little more than half strenght. At one time the Directorate had 15 agricultural economists with Master's degrees, as opposed to 8 today. Most of those who have left have gone to work for various "offices de mise en valeur", parastatal organizations responsible for specific geographic areas. The main reason for leaving is not salary as such but greater opportunity for upward mobility. To be able to function normally, each of the three divisions of the Planning Directorate should have at least five agricultural economists, which would put the Directorate at its full professional strenght.

Even at its full strenght, the Directorate would not be able to do major background studies or prepare investment feasibility studies. The Ministry has an agency which is charged with this responsibility. This is the Centre National des Etudes Agricoles (National Center for Agricultural Studies), which is a parastatal organization under the jurisdiction of the Ministry of Agriculture. The CNEA was created by decree in 1974 and has been operational since 1975. It operates on a commercial basis with complete administrative and financial autonomy. It offers its services on a contract basis, like a consulting firm. The Ministry of Agriculture and the Ministry of Planning are its most important customers, but it works also for international organizations and private firms. The CNEA is the chief provider of external studies and analysis for the Ministry of Agriculture. It does about 80 per cent of this kind of work done for the Ministry.

The CNEA offers the following kind of services

A. Studies
- background and sectoral studies
- project identification and evaluation
- studies of integrated rural development projects
- irrigation management studies
- economic studies
- project monitoring and auditing
- preparation and evaluation of tenders

B. Training
- in-service training programs
- seminars involving theoretical analysis
- workshops based on case studies

The full time professional staff of the CNEA in July 1981 was 28, among whom there were 8 agricultural economists and 2 rural sociologists. All of the economists and sociologists have Master's degrees. The other professional people are mainly agricultural scientists and engineers. CNEA is one of the few policy oriented institutions in Africa with rural sociologists on its team. It is widely believed in Africa that sociologists are a kind of luxury that governments of rich countries can indulge in.

The CNEA calls upon the University and research institutions for consulting assistance in specialized areas, but not in agricultural economists. It has as much or more strenght than any other organization in the latter area. The director of the CNEA confirmed the view there is a shortage of agricultural economists in the country and that the economists in the Ministry of Agriculture are stretched too thin.

Another directorate of the Ministry of Agriculture which needs to be mentioned in connection with training and research is the Directorate of Education, Research, and Extension (Direction de l'Enseignement, de la Recherche et de la Vulgarisation). This Directorate monitors all training and research programs, handles fellowships and publishes an annual report which lists all secondary and higher agricultural education programs with numbers of staff and students, as well as budgets and facilities. It lists also the research activities of the country's major agricultural research institutions (Institut National de la Recherche Agronomique de Tunisie, Institut National des Recherches Forestières, Centre de Recherche du Génie Rural, Institut des Régions Arides) and the activities of the extension service, including press, T.V. and radio programs.

2.2. The Ministère du Plan et des Finances.

As is evident from the discussion of the Ministry of Agriculture, much of the planning and program analysis in Tunisia is carried out by the technical ministries and their supporting agencies. In the Ministry of Planning and Finance, the central coordinating activity is carried out by the Direction Générale du Plan, which has three Directorates: (1) central planning, (2) Regional Planning and Rural Development, and (3) Human Resources. The Directorate for Central Planning in turn has five subdirectorates for (1) agriculture, (2) industry, (3) services, (4) micro-planning and (5) short-term planning (planification conjucturelle). In all there are about 30 professionals in the Directorate General, about one-half of whom are located in the Directorate for central planning. Most of these professionals are economists, but there are also some engineers among them. The Directorate General has a technical supporting staff of about 60 persons at the level of ingénieur adjoint, which implies two years of university training. Although there were a number of vacancies, the staffing of the Directorate General was fairly complete. There is some turnover, but no evidence of any general shortage of economists. The Ministry's biggest need is for a regular program of seminars and workshops for in-service training. At the moment there is no such in-house program. New recruits essentially learn by doing, although the Ministry has made use of the seminars offered by the Centre National des Etudes Agricoles and has sent people to courses offered by the World Bank and the FAO.

The Directorate General concerns itself mainly with the final stages of planning and policy analysis. In addition to the inputs of the technical ministries and a close cooperation with the offices handling the budget and finances, the Directorate General of the Plan has the support of specialized institutions. For purposes of basic economic analysis, the most important of these is the Institut d'Economie Quantitative "Ali Bach-Hamba", which is under the jurisdiction of the Ministry of Planning and Finance. The Ministry has also a statistical institute, which is physically located with the "Ali Bach-Hamba" Institute, and a National Center for Industrial Studies. The latter is a parastatal consulting and studies organization that operates in a fashion similar to the Centre National des Etudes Agricoles of the Ministry of Agriculture.

2.3. The "Ali Bach-Hamba" Institute of Quantitative Economics.

This Institute does the basic modeling, quantitative, and policy analysis for the Ministry of Planning and Finance. Currently it is working on an economic model of the Tunisian economy which will be used for long-term macro and sectoral projections. This is a mathematical model with 68 behavioural and structural equations, which can be used for impact analysis and for projecting the behaviour of major variables such as growth rates, income and balance of payments levels. The Institute is working also on a new large input-output table for the economy. In addition, it is carrying out a number of studies relating to population, employment, income distribution, prices, productivity, balance of payments, external debt, industrial integration and value-added taxes. It participates also in the International Information System on Economic and Social Development initiated by IDRC. To carry out this work the Institute has a professional staff of 20 economists, about one-half of whom have doctorate degrees. The Institute does only economic analysis. It does not engage in any training or seminar activities. It does not interact in any organic fashion with the University establishment.

3.0. Training and Research in the Rural Social Sciences.

As in most francophone countries, there is a rather sharp cleavage between higher education and the academic research establishment on the one hand and the ministerial establishment,on the other hand. There are a number of instances where there are personal interactions, such as university staff serving on governmental commissions and ministerial staff teaching part-time, but the two sides are seen as having distinct and separate functions. The ministries do not look upon the higher education staff as a resource upon which they can draw to deal with their problems.

3.1. The Institut National Agronomique de Tunis (INAT).

This is the leading higher level agricultural school in the country. There are three institutions which give four and six year degrees (veterinary science, agricultural engineering, and horticulture), and there are eight schools which give two-year diplomas. With a two-year diploma the holder may be appointed as Ingénieur Adjoint; a four-year degree leads to the rank of Ingénieur des Traveaux d'Etat, and a six-year degree leads to the title of Ingénieur Principal.

The INAT is the only school with a department of agricultural economics. The school as a whole has a permanent staff of around 50 persons and a student body of some 350. It takes in an average of around 150 students per year and awards about 50-60 four-year degrees and 8-10 six-year degrees. It does not award two-year diplomas.

The INAT Department of Rural Economy has a staff of seven persons, including four agricultural economists, one socio-economist, one geographer and one sociologist. In terms of rank, there are one Maître de Conférence (associate professor), one Ingénieur en Chef (associate professor), four Maîtres Assistants (Assistant professors) and one Assistant (instructor). The specialities of the four agricultural economists are in

(1) farm management
(2) marketing and econometries
(3) planning and development, and
(4) food industry economics.

All of the staff in the Rural Economy Department are Tunisians.

The INAT study program consists of three two-year segments. During the first two years all students take the same courses. During the third and fourth year, some courses are in commom for all students, but they must also select courses in one of three areas: (1) agronomy, (2) fisheries, and (3) agricultural engineering. All students who select the agronomy option take an introductory course in economics during the third year of studies. During the fourth year, agronomy students take some courses in commom, including a course in rural sociology, but in addition to the commom courses they take special courses in either economics, plant production, or animal production. The economics option includes courses in the social psychology of work, management, econometrics, operations research, microeconomics, agrarian reform, development and planning, and international economic relations. The nature of these courses indicates that the objective is primarily to introduce students to a variety of analytical techniques and topics. The four-year program does not produce agricultural economists, even though the students write their mémoire in the field of their option. More thorough training in agricultural economics is available in the fifth and sixth years for those students who want to prepare a Diplôme de 3 Cycle. The fifth year involves courses in farm management, marketing, microeconomics and development planning. The sixth year is devoted to the preparation of a thesis.

Of the 50 or so students who receive a four-year degree from INAT, about 5-7 each year select the fourth year economics option. On the average 2-3 people a year are awarded the six-year degree with a specialization in agricultural economics. This is a rather small output of agricultural economists, given the needs of the country and evidence of a strong demand.In view of the fact that the school as a whole turns out only 8-10 six-year degrees per year, there does not seem to be much room for more agricultural economists unless the student body were to expand. At the moment this is not possible due to the limitation of physical facilities.

All of the staff members of the INAT Department of Rural Economy are required to be engaged in research as well as teaching. The official philosophy of the Department stresses that research is an essential complement to teaching and should aim at making course work more relevant for local conditions. Part of the research effort is oriented toward the development of a data bank on Tunisian agricultural production systems. Four major research areas were outlined by the department research co-ordinator: (1) problems of food self-sufficiency, (2) decision-making in agriculture, (3) family labor, especially of women, in subsistence farming, and (4) production function analysis in grain production.

3.2. The Institut National de la Recherche Agronomique de Tunisie (INAT).

This is the country's main agricultural research center. It is located on the outskirts of Tunis and has 21 experimental stations in various parts of the country attached to it. Although most of the effort of INRAT is devoted to classical agricultural research, it does have a small Department of Agricultural Economics and Biometrics. This Department has four agricultural economists, all with advanced degrees, and all but one with considerable research experience. The Department has been functioning for ten years, but it has never had more than four professionals. Until now, most of their work has been concerned with micro level production analysis. Major areas of interest have been large scale grain production and livestock raising in Northern Tunisia. The economists of the Department have been engaged also in action-oriented research with producer's co-operatives. Through multidisciplinary approaches they have tried to discover the factors which prevent or hinder increases in productivity. It was not possible to establish what research results have been achieved to date. It was also not clear to what extent there is interaction between the economists and the agricultural scientists of INRAT. There was not much evidence of an integrated approach.

3.3. The Institut des Régions Arides at Medenine.

By contrast, this Institute is reported to have an interesting multidisciplinary approach to integrated rural development in the country's arid regions. It has an applied research and training program which works directly with peasants to assist them in finding ways to increase output and halt the encroachment of the desert. The Institute has 18 professionals with the rank of ingénieur, including 7 in the social sciences (3 agricultural economists, 2 economists, and 2 geographers). Neither in the case of this Institute nor in the case of INRAT does there seem to be any interaction either with the schools of agriculture or with the Ministry of Agriculture. This is in spite of the fact that all of these institutions are dependent on the Ministry of Agriculture.

3.4. The University of Tunis.

Social Sciences in the University of Tunis are taught in the Faculty of Law and Economics and in the Faculty of Letters and Human Sciences.

The Faculté de Droit et des Sciences Politiques et Economiques has a total permanent staff of arcund 100, about one-half of whom are in economics. Among the economics staff there are 3 professors, 3 Maîtres de Conférence, 10 Maîtres Assistants, about 30 Assistants and 5 Assistants Délégués. The latter rank compares essentially to the level of teaching assistant and really does not fit into the permanent position category. Staff at the rank of Assistant have to have a DEA (Diplôme d'Etudes Approfondies - 2 years after Maîtrise or a Doctorat de 3e Cycle. To be Maître Assistant, a person has to have a Doctorat d'Etat or a Ph. D. Ranks above this level require teaching and research experience as well as a competitive examination and review by a commission. Until a few years ago, teaching experience was considered most important, but now greater emphasis is given to research performance. The Dean of the faculty stressed the importance of research and noted that within the faculty there is a multidisciplinary research group that focusses on problems of economic development especially rural development. For the most part, however, research seems to consist of individual efforts and much of it no doubt is related to getting advanced degrees.

The teaching program is in the French mold, with a three stage degree program, each taking two years. The first two years all economics students take the same courses, mainly introductory courses in economics, statistics, economic geography, accounting and constitutional law. They also take English during the first two years, even though preparation in English during secondary school is a condition of admission to the Faculty. For the next two years the students must enroll in one of two sections: Development and Planning, or Management (gestion des entreprises). The system seems to be rather rigid and difficult to adapt to changing circumstances. After four years of study, a student may be awarded the Maîtrise in economics. Until two years ago the Faculty awarded also a Diplôme d'Etudes Supérieures (DES) following the Maîtrise. This has now been replaced by a Diplôme d'Etudes Approfondies (DEA), which takes about two years after the Maîtrise and takes the place of a Doctorat de 3e Cycle. After the DEA a student may enroll in the program leading to the Doctorat d'Etat.

In 1980-81 there were about 1800 students enrolled in the four-year program. No breakdown by years was available. The Faculty expects to award about 120-150 Maîtrises this year, which represents a rather low percentage of the students admitted to the first year. There is a very large drop out at the end of the first year. About one-third of those obtaining the Maîtrise specialize in Development and Planning and two-thirds in management. During 1980-81 there were about 120 students preparing the DEA in economics. The exact number of students obtaining the DEA this year won't be determined until the fall, but it will probably be 30 to 50. There are only a few candidates preparing the Doctorat d'Etat. Since 1972 the Faculty has awarded altogether only 6 Doctorats d'Etat in economics. On the whole, students with degrees in economics seem to have no difficulties finding jobs in Tunisia, although the demand is reported to be not as strong as it was a few years ago. It should be mentioned here that there is also a Faculty of Economics and Management Sciences at the University of Sfax. The available information indicates that the staff and number of students in this Faculty, which does not include law and political science, are about of the same size as the economics department of the Tunis Faculty. The staff at Sfax is reported to be younger and less experienced. This means that they have probably fewer advanced students.

3.5. The Centre d'Etudes et de Recherches Economiques et Sociales (CERES)- Tunis.

The Center is a well-established academic research institution that has been in existence since 1962. It is part of the University system and under the Ministry of Higher Education. In a sense, the Center completes the gamut of research intitutions in Tunisia, ranging from the very applied to the predominantly academic. The CERES has three kinds of researchers : some 15 fulltime researchers, 10-15 part time researchers and a variable number of visiting research associates. The part time researchers are usually members of the regular university teaching staff. Organizationally, the CERES is divided into eight sections: (1) sociology, (2) demography, (3) geography, (4) linguistics, (5) political science and law, (6) history, (7) literature, and (8) economics. Not all of these sections are equally active. For instance, in 1981 there were no economists on the permanent staff although the addition of four economists is expected soon. On the other hand, there were eight sociologists, six demographers, six geographers, and four historians.

The enduring strength of the CERES research program is attested by its publication record. It has its own journal, the Revue Tunisienne de Sciences Sociales, which has been published continuously since 1964. In addition, the Center publishes the Cahiers du CERES, which consists of monographic studies and of proceedings of colloquia and seminars offered at the Center. The whole represents a very impressive research and intellectual performance. The major emphasis is on studies in sociology (especially rural sociology), demography (especially migrations), and geography. All of the fields of the various sections mentioned above are represented, but economics does not occupy a prominent place. Economists who want to address themselves to their professional colleagues would not want to publish in an interdisciplinary journal.

The major theme of the current research program at the CERES is still rural development. Other areas of emphasis are the young (behavior, education, employment) and the national movement. Although the Center responds to occasional research demands from ministries, the vast majority of its research activities are internally determined. Research questions seem to be formulated more in terms of their fundamental and intellectual interest than in terms of practical policy relevance.

4.0. Concluding Remarks

Tunesia is well provided for with high quality training and research institutions. But its output of agricultural economists remains inadequate for the country's needs. There is a serious shortage of agricultural economists in government offices, although there seems to be no real shortage of general economists or other social scientists. With regard to utilization, there is very little interaction between academic institutions and governmental offices.

Chapter 10

U P P E R V O L T A

1.0. Overview.

In terms of per capita income Upper Volta is one of the poorest countries in the world, it depends almost exclusively on agriculture. Some 90 per cent of the resident work force are engaged in crop or livestock production. The agricultural sector is practically the only source of foreign exchange. In 1977 it generated 93.4 per cent of the value of exports, consisting mainly of livestock (50%) cotton and peanuts. The export of livestock is not an indication of an internal excess supply of protein, but of the fact that the people of Upper Volta cannot afford to buy their own meat products. The country is presently not able to meet its food requirements. The slightest drop in production leads to severe shortages in parts of the country. The problem is not only one of production but of collection, storage and transportation. The weakness of the infrastructure means that there may be relative abundance in one part of the country while there is famine in another. A recent government report estimates that annual production of traditional grains (millet, sorghum, maize) for 1978-80 was on the order of 1,051,000 tons, while the nutritional need of the country was 1,147,000 tons. It is the government's objective to meet this and other needs by 1985.

The government is aware of the many physical, human and organizational constraints that face the country. The economy has been stagnant for the last ten years. Between 1970 and 1980 gross domestic product has increased at a rate of .6 per cent per annum in real terms, but per capita real GDP decreased at a rate of .8 per cent. The per capita GDP, which was at a level of 16,850 CFA in 1970, had fallen to 15,000 CFA (in 1970 prices) by 1980. The government has taken note of some of the shortcomings of the country's economic planning and management. It recognizes that its planning approach has suffered from both lack of coherence and over centralizaiton. The lack of coherence is a consequence of focussing on individual projects wihout adequate attention to their interrelationships and to their long-term impact. Most development projects are financed by outside aid or loan funds. They tend to be based on feasibility studies which are concerned only with the project and disregard the broader and long-term impact. To a considerable extent the country has allowed foreign donors and lenders determine the profile of its development.

A recent Government report (Programme Substantiel d'Action 1981-1990) has taken note of some of the rural social science dimensions of the country's problems:
"Applied research is insufficient and suffers from shortages of qualified personnel and material and financial resources. Yet, one must take into account the socio-economic constraints of agricultural enterprises before one can propose to the peasant methods of production and management that are adapted to the rural setting ..... Administrative centralization is also a bottleneck affecting the effectiveness of intervention at the level of the peasant. There is lack of information about actual conditions, lack of access to available services, long procedural delays..... It must also be underlined that there is a lack of coordination among the activities of different administrations and services .....".

Lack of clear policy objectives, weak organization and poor management only add to the burden of a very weak extension system. In 1977/78 there was one extension worker per 500 agricultural production units (around 5000 persons).

The Government of Upper Volta has spelled out its development objectives for the 1980's for the U.N. Conference for the Least Developped Countries. It top three objectives are:
(1) Self-sufficiency and security of food production.
(2) Increased income for agricultural and livestock producers.
(3) Improvement of living conditions.

In spite of many handicaps, these are realistic objectives, but above all the country must improve the organization, management and utilization of its human resources.

2.0. The Demand for and Utilization of Rural Social Scientists.

It is easy to make an argument that Upper Volta has a great need for people trained in the rural social sciences, but under present conditions there is little expressed demand for them. Neither the Ministry of Economy and Planning nor the Ministry of Rural Development have been doing much analytical work. Yet, there are very able people in both ministries, people who are aware of the shortcomings of past methods of operating. In 1978 the Government decided on a more decentralized approach to national planning and rural development. On top of that, there was a change of government last fall which has had an impact on policies. None of these changes have as yet been fully digested. The Ministries are in the process of changing their organizational structures, and it is not yet clear how some of the responsibilities will be allocated.

2.1. Ministry of Economy and Planning.

In the Ministry of Economy and Planning there are five offices (directions):
(1) The Programming Office (Direction de la Programmation) which has basic responsibility for the coherence and internal consistency of the national development plan and for defining sectorial priorities.
(2) The Financial Execution Office (Direction de l'Execution Financière) which is responsible for monitoring the financial side of project execution
(3) The Office of Financial and Technical Cooperation (Direction de la Coopération Financière et Technique) which handles external aid and loan agreements.
(4) The Office of Studies and Projects (Direction des Etudes et Projets) which is responsible for identifying and evaluating projects as well as background and impact studies.
(5) The Office of Regional Planning (Direction de l'Aménagement du Territoire) which is supposed to carry out planning at the Département level.

All of these Offices have been established fairly recently and none of them is fully operational. The best outfitted in terms of personnel is the Programming Office, which was formerly the Direction Générale du Plan. It has 14 professionals (11 nationals and 3 expatriates), most of whom have some post-graduate training. Under normal circumstances a staff of this size should be able to put together a meaningful national plan containing an analysis of the country's needs and resources and a thoughtful discussion of problems and policy alternatives. This has not been happening, for a number of reasons, including the project by project approach of the past, the relative inexperience of the staff, and the lack of supporting elements within the ministry itself and in other ministries.

For its 14 professionals, the Programming Office has only two secretaries. Papers sometimes go untyped for long periods of time. A new plan for the period 1982-86 is supposed to come out by the end of the year, but there has been very little work done on it so far.

The Office of Studies and Projects has 3 expatriates and 9 nationals. The expatriates in the Ministry of Economy and Planning are usually tied to some specific foreign aid project, for which they have administrative responsiblity. To be effective they have to provide their own logistic and secretarial support. For the preparation of projects, the Office of Studies and Projects relies on donor agencies and consulting firms. The government does not have the capacity for a truly independent evaluation of these projects, since the evaluators are often tied to project preparers.

In the Office of Regional Planning there are 15 professionals, including 5 economists (1 expatriate) and 9 geographers (3 expatriates). One of them has a Doctorat de 3e Cycle and two have a Diplôme d'Etudes Approfondies (master's). The others have a Maîtrise. As in other offices of the Ministry, most of the national professionals are very young and have limited experience. Although this Office is supposed to operate mainly at the Département level, so far only four field offices have been established. Seven of the professionals are stationed in the field. They are just now beginning to collect data at the regional level, which will serve as a basis for regional development models. In principle, there should be 11 field offices, one for each Département, providing each prefect with an economic planning team. It was not clear from discussions how the activities of the Regional Planning Office and of the Programming Office will be integrated. The two offices are located in different parts of the city and seem to have very little contact with each other.

Although there seems to be a shortage of people with substantial economic planning experience, there seems to be no shortage of people with degrees in economics in Upper Volta. Some of them are reported to be unemployed. If that is indeed the case, it must be even more so for people with degrees in other social sciences, since they are generally less in demand. It would seem, however, that with more effective organization and utilization, many more social scientists could be productively employed.

2.2. The Ministry of Rural Development.

Although each of the Offices of this Ministry participates in policy and project discussions, there are two - the Direction du Service de Planification and the Direction des Services Agricoles - which are specifically concerned with rural development. The Direction du Service de Planification was formerly concerned mainly with training (formation professionelle) and human resources, but it is now being transformed into an office of studies and project . Since this is a recent development, the Office is not yet operational. Its role will be to draw up terms of reference for studies and projects, participate in feasibility studies done by outside agencies, evaluate projects, and develop sectoral policies. At present the Office has one administrative official and four professionals: two agricultural economists with a Master's degree, one economist with a Maîtrise, and one geographer with a Doctorat de 3e Cycle. There is no expatriate in the Office. One Dutch expert is expected to look after projects financed by the Dutch Government. The Director of the Office is aware that he needs a much more substantial professional staff. A request has been made to USAID for the training of two agricultural economists per year at the Master's level.

The Direction des Services Agricoles is the link between the Ministry of Rural Development and the Organismes Régionaux de Développement (ORD - regional development agencies), where most of the rural development projects are administered. The Director of the Services Agricoles indicated that it is at the level of the ORD's that there are major needs for rural social scientists. It is at this level that basic information about farming systems needs to be gathered and analysed. At present only 2 of the 11 ORD's have an agricultural economist and none has a sociologist or anthropologist. To carry out their tasks, the Director said, each ORD should have a study group including one agricultural economist, one social anthropologist and one geographer. In addition, each of these disciplines should have one representative at the central ministerial level. This means that there is a need for 10 agricultural economists (2 are in place already), 12 social antropologists, and 12 geographers.

At present there is a number of people with training in agricultural economics scattered in various offices of the Ministry of Rural Development, but they function mainly as administrators. Until now the Ministry has looked mainly at the strictly technical side of project feasibility, leaving economic feasibility essentially to those who provide the funding. Technical aspects of agricultural policy are discussed within the Ministry by a "conférence des cadres", which does not concern itself with economic and social implications.

2.3. The Institut Voltaïque de Recherche Agronomique et Zootechnique.

This institute is part of the Ministère de l'Enseignement Supérieur et de la Recherche Scientifique. Its function is supposed to be the organization and coordination of agricultural research for the country. It is evident that so far very little organization and coordination has taken place. The research that is being done is carried out by external agencies, who determine their own priorities and methods of operation. There is very little Voltaïc scientific research input or feedback, but the Institute tries to keep informed of what is going on. In the rural social sciences there are three research programs: the farming systems unit at Kamboinsé a project at Saria, and one at Bobo-Dioulasso dealing with cotton. The latter two involve each only one person, whereas the farming systems unit has three.

The Director believes that each research station should have a rural social science unit. He also expressed interest in getting assistance from ISNAR to organize the national program of agricultural research.

3.0. Training and Research in the Rural Social Sciences.

There are no institutions in Upper Volta specializing in rural social science training or research.

3.1. The Centre d'Etudes de Documentation, de Recherches Economiques et Sociales (CEDRES).

Aside from the farming systems research mentioned above, which is connected with agricultural research, CEDRES is only social science research institution in the country. It is a very young and struggling organization and is part of the Ecole Supérieure des Sciences Economiques (ESSEC) of the University of Ouagadougou. All of the five CEDRES researchers are full-time staff members of the ESSEC. The CEDRES has no operating budget of its own;

its facilities and clerical support are part of ESSEC. It develops its own research projects, for which it then seeks either governmental or external aid funding. At the moment it has two projects under way: one on the Voltaic transport system, for which it has received an initial 1 million CFA (US$ 3570) from the Ministry of Higher Education and Scientific Research; and one project on the impact in rural areas of an artisan training program. Funding for this seconf project is being provided by IDRC. In spite of its limited facilities, including a very modest library, the Center inspires confidence, not so much because of its accomplishments to date but because of its determined leadership. The center puts out its own quaterly (mimeographed) journal, the Revue Economique et Sociale Voltaïque, which seeks to serve as a vehicle of ideas and debate not only for Upper Volta but for all of Francophone Black Africa.

3.2. Ecole Supérieure des Sciences Economiques (ESSEC)

The ESSEC started in 1975 and turned out its first class of Maîtrise holders in 1979. It has a full-time staff of 9 persons, including 7 expatriates, and it uses some 30 part-time teachers. These are either government officials who teach a course to earn extra income, or expatriate visiting professors who come for one month at a time. During the past year there were 3 such visiting professors. Of the 9 regular staff members, two were Professeurs Agrégés (French) and the others were Maîtres Assistants, which means they had either a Doctorat d'Etat or a Doctorat de 3e Cycle. For the coming year the number of full-time staff will increase to 15, including 7 nationals.

The teaching program is divided into two "cycles". The first two years are the same for all students and cover the standard French topics of introductory economic theory, quantitative analysis and history of economic thought. The only concessions to Africa are a one semester course in African economic history and a one semester course on the economy of Upper Volta. During the second "cycle", comprising the third and fourth year, the students have a few courses in common, but they have to specialize in either "planning and development" or "economic administration and management of organizations". The common courses are standard economic courses, but they include also an interesting sounding course on "Comparative West-African Development". The "planning and development" option includes year-long courses on rural development, development planning, and project evaluation. The "administrative" option stresses business and legal topics. At the end of three years the students are awarded a Licence. Almost all of those who obtain the Licence will continue into the fourth year. Between the third and fourth year, the students are required to do a practical internship in some governmental or private agency. To obtain the Maîtrise they have to write up a project called mémoire de fin d'études, which has to be defended before a jury. If the 1981 batch of memoires is a good sample, they deal with a wide range of commercial, industrial, and policy issues, with the exception of agriculture and rural development. Of the 19 mémoires, submitted for 1981 only one related to rural development.

The total enrolment of the ESSEC was 210 students during 1980/81. So far the school has turned out 54 Maîtrises holders since its inception: 14 in 1979, 20 in 1980, and 20 in 1981. In this year's class there were 5 in the "planning and development" option and 15 in the "administration and management" option. Those with a Maîtrise in the latter option are hard to place; private establishments prefer to hire people from vocational schools. The ESSEC does not award advanced degrees. This year it will send 2 or 3 of its graduates abroad for a doctorate. The school is under

considerable pressure to increase its intake, because the government is finding it more difficult to send students to neighboring countries for their undergraduate education.

3.3. The Institut Supérieur Polytechnique (ISP).

The ISP is part of the University of Ouagadougou and is the higher level school of agriculture of Upper Volta. It turns out Ingénieurs des Techniques du Developpement Rural after three-years of study and Ingénieurs du Développement Rural after five-years. Neither program offers much formal exposure to agricultural economics or rural social sciences. In the second year of the short program the students have the equivalent of one hour per week of "general and rural economics", one hour of accounting, and one hour of extension and rural sociology. Those who take the long program receive one and one-half hour per week of "économie rurale" during their second year. During their third year they receive two hours per week of "economics and management", the latter being mainly accounting. During the fourth year they have two hours per week on "the economics of underdevelopment", two hours on "planning and project analysis" and one hour on "techniques d'animation". It is evident that neither program provides an analytical foundation for dealing with economic and social issues. That is not the objective of the school. The school has turned out 40 Ingénieurs du Developpement Rural since the first class of 1978; 7 in 1978; 6 in 1979; 15 in 1980 and 12 in 1981. There have been about equal numbers turned out in the short program. The permanent staff numbers 34 including 21 expatriates. There is one person teaching rural economy and one person (an American) teaching extension.

3.4. The Ecole des Lettres et Sciences Humaines.

This school has two departments in the social science areas; a department of geography and a department of the "sciences of man". The school was the first establishment of the University of Ouagadougou. The Geography Department has a full-time staff of 6 persons including 2 nationals. It offers a four year program leading to a Maîtrise. In 1981 some 17 students were awarded the Maîtrise degree. The Department of the "sciences of man" was created in 1980. It includes sociology/anthropolocy, philosophy and psychology, which would seem to correspond to a philosophical variant of behavioral sciences. It has a staff of 7 and around 35 students in its first year.

4.0. Concluding Remarks.

In Upper Volta there is a great need but little expressed demand for training and research in the rural social sciences. The country has very limited resources, which requires very good planning and management for progress to be made in the battle against poverty. But for that, the country lacks much of the basic information, organization, and skilled manpower required. There is an awareness of these needs among university and government officials, but much progress remains to be made.

Chapter 11

Z I M B A B W E

1.0. Overview.

Zimbabwe is at an important turning point in its history. After many years of internal struggle a new government with a black majority has taken over which is determined to redress the economic, social and political inequities of the past. This policy has far-reaching implications for the restructuring of the national economy as a whole and particularly for agriculture.

At independence some 6000 white farmers held title to 46 per cent of the country's agricultural land. Most of this land is in the most favorable ecological zones. At the other extreme, there are about 700,000 black families living on communally held Tribal Trust Lands (TTLs). They are mainly engaged in subsistence crop and livestock production. With present technology these areas can support only about 275,000 peasant families, or a little more than one third of the occupants. In between the big commercial farms and the TTLs are the former African Purchase Areas (APAs) which cover some 1.4 million hectares. The 8,500 farmers in these areas are black commercial cultivators, with individual titles to their land.

The new government is pursuing a vigorous policy of land acquisition through purchase in order to resettle wartime refugees and relieve overcrowding in the former TTLs. Other measures to relieve overcrowding involve employment creation in urban areas and movement of families from rural areas to join their chief breadwinners employed in urban locations. At the same time the government intends to improve the lives of those remaining on the former TTLs through rural development and increased agricultural productivity. Five regions where pressure on resources is most severe have been designated at Intensive Rural Development Areas (IRDAs). As less intensive program is planned for the residual areas of the former TTLs, involving a gradual extension of infrastructure, as well as agricultural and social services.

The magnitude of the agricultural and rural development task becomes evident when it is realized that the area of the former TTLs represents 42 per cent of the agricultural land , support 50 per cent of the country's population, but produce only 20 per cent of total agricultural output and 4 per cent of agricultural sales. The average per capita income of peasants on communal holding was estimated to be 23 Zimbabwe dollars in 1979 (about $ 30 US). With remittances from relatives working in urban areas, the per capita per annum income reached Z$ 30. By contrast the 1979 per capita income on (white and black) commercial farms was Z$ 120 and in urban areas it exceeded Z$ 1250.

In spite of the task of agricultural and rural development it faces, Zimbabwe is much more fortunate than most African countries. The country is rich in natural resources and has a substantial body of trained manpower. Zimbabwe is more than self-sufficient in food production and is able to export substantial quantities of food and other agricultural and livestock products. The chief economist for the Agricultural Marketing Authority has summarized the country's advantages as follows: "We have considerable unutilized resources in the forms of good quality cropping land, substantive future irrigation potential and significant scope for increasing livestock production. We have a sound body of expertise within the service infrastructure which support our farm industry and the technology which is

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available to the farmer is quite as advanced as the available to producers anywhere in the world. We have an efficient and sophisticated marketing and transport infrastructure. Our financial institutions are unusually highly developed..... Our commercial maintenance and supply system is also highly competitive and efficient". These remarks, of course, apply primarily to the white commercial sector, which will have to generate the resources for uplifting the peasant sector.

2.0. Demand for and Uses of Rural Social Scientists.

At this time most governmental offices are in the midst of transformation and reorganization. New ministries, such as the Ministry of Manpower Planning and the Ministry of Planning and Development, have been created. Many of the older ministries are being reorganized to conform with the policy objectives of the new government and to eliminate the previous segregation of services for the white and black populations. In addition, there has been a substantial exodus of senior white civil servants since independence and an influx of mostly black Zimbabweans who had lived abroad during the UDI (Unilateral Declaration of Independence) period. In this context it is difficult for many ministries to have a clear idea of their manpower requirements or of the requirements of the rest of the economy. The Ministry of Manpower lanning intends to undertake a major survey of manpower needs and resources. Most ministries until now have been staffed by generalists who acquired their skills through years of experience. This tradition makes it difficult for some of the ministries to cope with rapid change and with a large influx of people with university degrees but little practical administrative experience.

2.1. The Ministry of Agriculture.

Within the Ministry of Agriculture the largest group of economists is located in the Economicsand Market Branch, which has 16 posts for economists and agricultural economists. At the moment only 13 of the 16 posts are filled. Of the 13 staff members, 3 have master's degrees but very little experience. Until now the Ministry of Agriculture has been concerned primarily with the commercial sector. Its functions have not been developmental in nature. It monitors prices and outputs, and projects trends in crops, revenues, and incomes. It deals also with logistics and transport systems for agricultural goods and advises the government on policy issues. More recently new tasks have been given to the Ministry of Agriculture, such as the preparation of proposals for the Regional Food Security Project of the nine countries of the South African Development Coordination Conference (SADCC). The head of the Economics and Market Branch feels that at present the Ministry does not have the professional expertise to do this kind of work properly. The Ministry needs more professionals, but mainly people with experience. At the moment it is not difficult to find people with degrees, but most have no experience and the degrees are often not in relevant fields.

The Agricultural Finance Corporation (AFC), is an agency of the Ministry of Agriculture. It provides the bulk of long term loans for commercial farmers, both black and white. The AFC operates along strictly commercial lines and does no developmental research. It has an experienced chief economist and two assistant economists, who are recent hires with little experience. The AFC does not provide research or professional services for its customers. However, the chief economist now sees a great need for multidisciplinary research to enable the AFC to develop credit schemes for peasant farmers. It wishes to organize peasants into savings and

credit groups. Its goal is to furnish credit to some 76,000 peasant farmers by 1983/4, but it does not know yet how to go about it. It knows very little about these potential clients, their understanding of borrowing, credit, debt and their attitudes toward the obligation of repayment. The AFC intends to meet these needs through its credit officers and assistant credit officers who operate in the field and are familiar with local conditions. It does not intend to expand its professional staff.

The Conservation and Extension Service of the Ministry of Agriculture is in charge of extension services for the commercial sector. It does not employ any economists or other social scientists. It hires graduates in agriculture for extension work with large farms and diploma holders for extension work with small commercial farmers. In both cases extension workers receive practical training in farm management and extension methods. The division does not do any research related to its extension work.

2.2. The Ministry of Lands, Resettlement and Rural Development.

This Ministry has the major responsibility for the peasant sector of agriculture. It is in charge of the vast resettlement program and extension services for peasant farmers. The Ministry does not have any planning capacity. It sees itself as a coordinating ministry working through other ministries, but it feels that it needs to have a planning body of its own. The Ministry has produced a paper entitled "Intensive Resettlement Policies and Procedures" which lays out the administrative steps and allocation of responsibilities. It presents a completely bureaucratic approach with no social science or economic content. It does not concern itself with the people or the ecological setting of the resettlement. Such matters are presumably left to be handled by the lowest level field officers who have direct contact with the people being resettled. The people in charge of the Ministry realize that they need more of a social science input, but at this time they are not organized to handle it. They do not know where they would get the planners and researchers with the required training and experience. They have worked with the Department of Land Management of the Faculty of Agriculture but have not called upon any other department of the University of Zimbabwe. As far as the Ministry is concerned, the Faculty of Social Studies of the University has not demonstrated ways in which it can be helpful. The Ministry feels that there is more expertise in government than in the University.

2.3. The Ministry of Local Government.

The Division of District Administration of the Ministry of Local Government (formerly the Ministry of Native Affairs) is responsible for the provision of the physical infrastructure for rural development. It has prepared the creation of a Rural Development Fund (RDF) which would be responsible for infrastructural development and maintenance in undeveloped areas. The RDF would have a budget of Z$ 40 million per annum and a permanent staff of 1450, in addition to several thousand casual workers. The approach in this case also seems to be mainly technical and administrative, with no formal economic or other social science components. Manpower needs are seen in terms of technically trained people and skilled craftsmen.

2.4. The Ministry of Planning and Development.

This is one of the new ministries, and it has very broad responsibilities. It is responsible for establishing investment priorities and for approving and monitoring all capital budgets. The Government of Zimbabwe has no tradition of development planning through a ministry of planning.

This makes the coordination task of the Ministry of Planning rather difficult, since it is a new ministry with a broad mandate that cuts into the prerogatives of older ministries with established routines. Even though the Ministry of Planning is still very young and had to start from scratch, it was responsible for putting together a white paper on economic policy (Growth with Equity) and a study entitled Zimcord (Zimbabwe Conference on Reconstruction and Development, March 23-27, 1981). Together these two documents are a statement of government economic policy for the next three years and an analysis of the country's immediate needs.

At present the Ministry of Planning has a professional staff of about 70 people, mainly economists. Only about 6 or 7 of them have postgraduate degrees. Most of them were trained abroad and have returned to Zimbabwe after independence. The Permanent Secretary noted that he has an experienced core staff but that there are not nearly enough of them. There are only 6 or 7 people to monitor a development capital budget of 250-300 million Zimbabwe dollars. There are also not enough people working on policy research and external relations. He sees a need for about a fourfold increase of the professional staff. He noted correctly that the only thing which legitimizes a ministry of planning is its analytical capacity. At the moment the Ministry does not expect much help from the economics staff of the University of Zimbabwe, but it is looking toward an expansion of the social sciences at the University as a source of future assistance. At the moment the University is looked upon as a source of potential staff with undergraduate degrees. For advanced training, the Ministry is looking outside of the country. It is considering to commission studies on a consulting basis with the economics staff of the University but has not yet done so until now.

3.0. Training and Research in the Rural Social Sciences.

3.1. The University of Zimbabwe.

Perhaps more than other national institution, the University of Zimbabwe stands at the threshold of major changes which will greatly affect its role. Until independence there was not much interaction between governmental ministries and University staff. The University was considered an "ivory tower" that could contribute little of a practical nature to society's needs. This situation was described by Professor W.J. Kamba, the University's Vice-Principal, as follows:

"In Zimbabwe, prior to Independence this year, the forging of a close relationship between the University and the community, the University and national development was inhibited by the nature of the social and political environment in which the University existed and operated. The University was in a sense an anachronism. Established by Royal Charter as a formally non-racial institution, it was at odds with the dominant white Rhodesian politics - it was attempting to carry on in a society which was organized and ordered on a racial basis. This tension between the University and its social and political environment dictated its role in the community and the country". Today, the University is expected to play a definite and positive role in the country's development. It is expected to play an active role in identifying and investigating development problems and in training the needed high level manpower.

This radical shift from a suspect institution to a positive contibutor to national development is not altogether easy. Within the community and

within the government the University's role is neither well understood nor fully accepted. It is hard to find governmental decision-makers who look to the University for assistance. On the other hand, in 1980 the Government did recruit seven senior academic staff to fill high level governmental positions, and a number of the present University staff serve on governmental commissions and boards. But these are for the most part personal links. Within the University itself, there is still doubt and uncertainty, not so much at the official but certainly at the personal level. The 1980 report of the Principal refers to "continued personal anxieties about the political stability of the country [and], the intentions of Government concerning the future control of the University".

The leadership of the University is determined to give the University an active role in the country's development process. The Council of the University has carried out an internal review which envisages the growth in University enrolment from the present (1980) level of 2225 students to 5000 over the next 3-4 years. The major thrust of this expansion seems to be oriented toward agriculture and education. Four major capital projects are underway in the 1980-82 triennium, Z$ 425,000 for a crop science building; Z$ 450,000 for facilities supporting a new M.Sc. degree in Food Science; Z$ 850,000 for a new building for the Faculty of Education; and Z$ 290,000 for lecture and seminar rooms for the Faculty of Law and Commerce. For the 1980 financial year the Government grant totalled Z$ 12,159,000 of which Z$ 10,490,000 was for recurrent expenditure and Z$ 1,669,999 for capital expenditure. The respective figures for 1979 were Z$ 8,420,000 and Z$ 400,000. There are no indications at this time how much the government and external donors are willing to commit for the University's expansion over the next few years. The Zimcord report indicates capital costs of Z$ 31,690,000 for the University for the period 1981-84. The University itself is awaiting the results of the planned National Manpower Survey in order to map a comprehensive strategy of expansion.

.2. <u>The Faculty of Social Studies</u>.

The Department of Economics of the University of Zimbabwe is in the Faculty of Social Studies. It has an established staff of seven members, plus the head of the department. At the moment there are only four staff and the Department head who are regular full time teachers. This is a rather weak department, both numerically and in terms of research and teaching experience. The head of the Department is fully conscious of this weakness and has indicated that the intention is to strengthen the Department. In recent years the Department has had an intake of 25-30 students per year preparing the B.Sc. (Econ.). This year the number has risen to 120. There are no postgraduate courses, but the Department gives an M.Phil. and a D.Phil. degree on a supervised research basis. At the moment there are two part time and two full time M.Phil. students and two D.Phil. students. The latter are also part time members of the teaching staff.

In recent times there have been several turnovers at the head of the Department. Under the leadership of the new head, Professor Ann Seidman, the Department has adopted a definite ideological orientation. The emphasis now is to move away from the kind of economic analysis that is dominant in Western Countries, what is usually referred to as neoclassical economics, and to give a greater role to marxist economics and to the experiences of Socialist countries, especially Cuba and China. This approach stresses a more inward looking kind of development approach, with emphasis on production for and development of the internal rather than the international market. The idea is to work toward national and regional self sufficiency in order to achieve greater independence of world markets

and to weaken the influence of the large transnational companies on the domestic economy.

This new orientation of the Department is just now getting under way, but the objective is to infuse it into all relevant courses. All such courses will therefore stress the development of the rural and small-scale industrial African sectors. The attitude toward the highly developed modern sector is that it should be redirected to foster the expansion of rural industry. Consistent with this orientation, the Department staff members feel that they will have to generate their own teaching and reading materials. They are strongly in favor of the organization of regional workshops and seminars to develop such materials using data and illustrations from Zimbabwe and neighboring countries.

Consistent with approach, the Department has strong reservations about postgraduate training abroad. The main argument against it is that it tends to be one-sided, that is, it overstresses the analysis of market economies and pays insufficient attention to institutional and structural transformation, which is at the core of the Marxist approach. Another argument is that outside training is not relevant for local conditions, which presumably means that the behavioral and structural assumptions underlying the analytic models relevant for the developed world are not suitable for a developing country. The Department therefore prefers to train people locally at both the M.Phil. and the D. Phil. levels. This is not the place to debate whether this ideological orientation of the Department will best serve the practical needs of policy analysis of the country. These needs are best served by hardheaded confrontation of desirable goals with empirical facts and forces. The very small sample of departemental reports on research projects that were available did not indicate much of a flair for this kind of hardheaded testing of theories against facts.

The Department of Sociology, which is also located in the Faculty of Social Studies, is actually a joint department of Sociology and Social Anthropology. It has a staff of one professor, five lecturers and one temporary teaching assistant. All of the posts are currently filled. Two of the lecturers are at the rank of senior lecturers. All but one lecturer and the teaching assistant have doctor's degrees. The research emphasis of the Department is on rural sociology.

The head of the Department sits on a Commission of Inquiry into the Agricultural Industry. Two of the lecturers have research projects in rural sociology, one dealing with resettlement and the other with the effects of the war on black freehold farmers.

The teaching program does not emphasize rural sociology. In fact, there is no course specifically in rural sociology, although there is one in urban sociology. The Department has altogether 50 students (2nd and 3rd year) working toward a B.Sc. (sociology). One student is doing an M.Phil. degree and one a D.Phil. degree. The Department does not offer postgraduate seminars or courses. The M.Sc. students have to write a thesis and may choose between several options including the sociol gy of development, but no rural sociology. Last year there were three M.Sc. students, but there are none this year. It was pointed out that sociology does not attract many postgraduate students because there are not many job opportunities in this field.

3.3. The Faculty of Agriculture.

Agricultural Economics at the University of Zimbabwe is taught in the Department of Land Management, one of three departments within the Faculty of Agriculture. The full academic establishment of the Department of Land Management is one professor and six lecturers. At the moment the departemental staff consists of one professor, one senior lecturer, one lecturer, one research fellow and one research economist in agricultural economics. In addition, there are three lecturers in social science and agricultural engineering.

The Department is in the process of adding a third lecturer in agricultural economics, which will raise the teaching staff in agricultural economics to four persons. Students in the department of Land Management have two options, either agricultural economics or soil science. The Faculty of Agriculture takes in about 50 students a year and awards around 35 B.Sc. degrees. Of those 35 about one-third select the agricultural economics option.

There are no postgraduate courses in agricultural economics, although students may obtain M.Phil. and D.Phil. degrees through supervised research. The Department has proposed a taught M.Sc. degree program which would turn out 20 degree holders each year, but the proposal was turned down by the government. The reason given was that the country could not absorb that many M.Sc.'s in agricultural economics each year. At present, the government has not yet figured out how to make use of people with postgraduate training in agricultural economics. Most of the B.Sc.'s in agricultural economics are employed by the private sector, mainly by marketing and farm organizations.

The Department of Land Management has been created only recently and is very actively engaged in demonstrating to the government and to the community the practical applicability of its teaching, research and consultancy services. It is the official policy of the Department "to encourage its staff to become involved in extension and consultancy activities as an important supplement to their research and teaching work. The aim is to ensure that both teaching and research remain relevant to the needs of the rural industries and that the department is in a position to complement the activities of other rural development agencies". From all appearances this policy is being carried out. The head of the department is a member of the 1981 Commission of Inquiry on Agriculture set up by the Prime Minister. Staff members are encouraged to become involved in assisting various farming bodies, governmental departments and agricultural agencies. The Department's philosophy is that they have to go out and demonstrate their usefulness in practical problem solving.

The courses offered in the agricultural economic program include economic principles, agricultural economics, farm management, land use and natural resource management, macroeconomic , managerial finance, advanced agricultural economics, applied agricultural production economics, agricultural development, natural resource economics, and extension and communication. Some of these courses are are taught by other departments. The notable absence in this program is rural sociology, which may reflect the fact that in the past most agriculture students were white and the program was oriented toward the white commercial farming sector. This orientation has now been changed, and it is planned to introduce a course in rural sociology as soon as the curriculum can be broadened and rendered more flexible. In addition to sociology, the head of the department wishes to introduce a course in agricultural marketing.

One of the objectives of the Department is to train people in the farming systems research approach as practiced by the CIMMYT program in East Africa. The head of the department is convinced that this approach could make an important contribution in establishing needed baseline data and appropriate strategies for the resettlement program. At the moment, such data are totally lacking. One postgraduate student of the Department is working with the Ministry of Land on these issues. Another interesting research area in which the Department is involved investigates the high success of peasant cotton growing in the Gokwe Tribal Trust Land. The peasants in this area are now producing 40 percent of the nation's cotton crop. The researchers are analyzing the reasons for this unprecedented success of peasant agriculture. The aim is to derive practical lessons which may aid in replicating this success elsewhere. This project is supported by a $ 75000 grant from USAID.

The agricultural economics program at the University of Zimbabwe has strong leadership and a clear understanding of its objectives. It has a very competent but rather young staff. Its greatest need is for more senior and experienced staff. With some assistance, this program could become a highly productive regional center in agricultural economics for the Southern African region.

3.4. The Institute of Adult Education.

One additional department which needs to be mentioned in connection with rural development is the Institute of Adult Education within the Faculty of Education. The main function of the Institute centers on the preparation of adult educators for a wide range of leadership roles in programs of rural and urban development. The Institute offers extension and consultative services in the form of short courses, seminars, and workshops on various aspects of rural and urban development in which adult education plays an important role. Its concern is to teach communication skills rather than substantive content. It acts also as a clearing house and source of advice. It has developped a comprehensive library on adult education. The teaching by the Institute is done mainly by correspondence and periodic visits on campus and in the field. The students are usually employed in jobs where they need adult education skills. The teaching program is tailored to individual needs. The Institute awards a diploma at the end of a two-year course, a B.Ed. after four years, as well as postgraduate degrees at the Master of Education, M.Phil. and D.Phil. levels. Much of the emphasis is on teaching techniques of non-formal education, which are useful in rural development. The Institute carries on also a research program which is closely related to its consulting and teaching activities. Among the research topics listed are: diffusion and adoption research related to the development of an integrated agricultural and saving program for small scale peasant farmers, and non formal adult education and communication processes in urban and rural development. The Institute has a director at the rank of professor and five lecturers on permanent appointment.

4.0. Concluding Comments.

The situation in Zimbabwe is highly promising but at this time of major readjustments still uncertain. The ministries have a strong core of experienced administrators but very few people with the technical expertise and the analytical capacity to carry out the vast task of resettlement and development of the traditional peasant sector. The government does not have enough people who can translate important policy goals into development strategies based on integrated projects. In the past, development strategies

were largely left to the private sector and the market mechanism, although there were many regulatory interventions, especially during the war period. The new policy goals of more balanced development, greater economic and social equity, and a better life for the rural majority will require important development measures by the government. For many of the actions to be taken with regard to the peasant sector there is a great need for data collection, research and analysis which at this time are virtually nonexistent. The rural social sciences at the University of Zimbabwe are still weak, the staffs are small and relatively inexperienced. Agricultura economics has made a good start but needs to be reinforced with one or two senior people. Perhaps the major constraint on the growth of the social sciences at this time is the lack of recognition outside of the University of the importance of the contribution which these disciplines can make to the development process. The University itself is still uncertain of its acceptance and appreciation by the community.

APPENDIX

Institutions and Persons Visited

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Mr. Michel DELATAILLE, Conseiller Technique (World Bank)
Direction des Etudes et Projets

Mme. Sarah LYNCH, Conseiller Technique (US
Direction des Etudes et Projects

Mme Odette MELAGA, Directeur Adjoint,
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Ministère de l'Economie et du Plan, Yaounde

Mme Elizabeth TANKEU, Directeur
Direction de la Planification

Dr. Patrice MANDENG, Chef de la Division des Resources Humaines
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Centre de Recherches Economiques et Demographiques (CRED)
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Prof.Georges NGANGO, Chef, Dept. des Sciences Economiques

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Faculté de Lettres et des Sciences Humaines
Prof. Martin NJEUMA, Doyen

Dr., Emmanuel NGWA NEBASINA, Chargé de Cours, Dept. de Géographie

Dr. Virginia DELANCEY, Chargé de Cours, Dept. de Géographie

Ecole Nationale Supérieure Agronomique, N'Kolbisson

Dr. Joseph KAMAJOU, Chef, Dept. d'Economie Rurale

I V O R Y C O A S T

Ministère de l'Agriculture, Abidjan

Dr. Désiré ASSA AYEMOU, Directeur de l'Enseignement et de la Formation Professionnelle Agricole

Mr. Théophile ASSA KOBI, Bureau d'Etudes Techniques et des Projets Agricoles (BETPA)

Ministère du Plan et de l'Industrie

Mr. Alexander BAHI, Chef du Cabinet

Mr. Kako OURAGA, Sous-Directeur, Direction Générale de la Planification

Mr. Jacques DELAUME, Direction du Secteur Primaire

Ministère de l'Enseignement Technique

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Prof. Leo P. MUREITHI, chairman

Dr. T.C.I. RYAN, in charge of postgraduate studies

Dept. of Sociology

Dr. E. MUGA, Chairman

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Prof. S.O. OLAYIDE, Vice-Chancellor, University of Ibadan

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Prof. N.O. ('Nimbe) ADEDIPE, Acting Dean, Faculty of Agriculture

Prof. C.T.I. ODU, Head, Dept. of Agronomy

Dr. F.A. AKINSANMI, Dept. of Forest Resource Management

Prof. Bisi OGUNFOWORA, Dept. of Agricultural Economics

Dr. M.G. IVBIJARO, Dept. of Agricultural Extension Services

Faculty of Social Sciences

Prof. T. ADEMOLA OYEJIDE, Dept. of Economics

University of Ife, Ile-Ife

Faculty of Social Science

Dr. O.O. OJO, Department of Economics

Faculty of agriculture

Prof. C.A. OSUNTOGUN, Head, Dept. of Agricultural Economics

Mr. OLUFEMI OLUDIMU, Dept. of Agricultural Economics

Nigerian Institute of Social and Economic Research (NISER)

Prof. Victor DIEJOMAOH, Director designate

IITA - Ibadan

Dr. H.C. KNIPSCHEER, Agricultural Economist

Ford Foundation, Ibadan

Dr. Werner KIENE, Agricultural Economist

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Mr. Osman MOHAMMED, Under Secretary, Planning

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Mr. G.B. THORPE, Arranged Program

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Prof. M.J. BLACKIE, Head, Dept. of Land Management

Faculty of Social Studies
Dr. R. MURAPA, Dean of Social Studies
Prof. G.L. CHAVUNDUKA, Head, Dept. of Sociology
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Science, Technology and Developing Countries

I. INTRODUCTION

This memorandum concerns science, technology and US relationships with developing countries. Its focus is on the processes by which the US government decides what international S&T activities to pursue, which mechanisms to use, and how the activities are to be financed. The memo does not contain a substantive discussion of S&T problems, nor an analysis of the policy objectives to be served by such international activities.[1]

A. Purpose

The last few years have seen a sharp rise in attention, nationally and internationally, to S&T and international relations. The Adminsitration attempted to strengthen the executive capacity for dealing with S&T and development by creating an Institute for Scientific and Technological Cooperation (ISTC). Congress, although declining to fund the ISTC after authorizing its creation, expressed concern for improving the efficiencey and effectiveness of international S&T activities in Title V of the Foreign Relations Act of 1979. This act strengthened the coordinating functions of the State Department and required it to make a comprehensive annual report to the Congress on the range of international activities carried out by the various agencies of government.

In August, 1979, a UN Conference on Science and Technology for Development (UNCSTD), held in Vienna, gave strong evidence of the increased importance assigned by developing countries to enhancing their own S&T capabilities.

These are only the major actions taken; there were many more, but they illustrate that the subject is on the minds of policy-makers here and abroad. It will be on the agenda of the next administration.

This memo is intended primarily to offer policy suggestions to the Director of OSTP and operational suggestions to the newly appointed science advisor in IDCA/AID. OSTP will be instrumental in setting the goals of the next administration on this subject, and IDCA/AID will be responsible for getting the most results out of the present system.

A second purpose of the memo is to examine whether "science and technology" is a useful perspective to take in considering US relations with developing countries. There are many lenses which could be used to consider international activities with S&T content. A single activity, for example cooperative research to develop a short-cycle maize variety in Egypt, can be viewed as 1) foreign aid, 2) S&T cooperation, and/or 3) work on the world food problem. The "usefulness" of the designation will depend in part on its value in explaining to decision-makers and ultimately to the public why it is being undertaken, who will undertake it, and of what does the activity consist.

B. Approach

In order to make the subject more concrete, the recent trip to four African countries by a high-level US delegation headed by Dr. Frank Press will be used to illustrate some of the opportunities and problems connected with international S&T activities. Other examples could have been selected, such as the Administration's resonses to the Waxman Amendment requiring planning for trilateral S&T cooperation in the Middle East, the efforts by AID and State/OES to define the proper role of S&T programs in our amply-funded relationship with Egypt, and the US preparation, participation and follow-up to the UNCSTD.

The advantages of using the Africa trip are that it is current, the follow-up is still in process, and it involved the participation of an unusual number of senior officials from science-based agencies not primarily engaged in foreign affairs. The disadvantage is that my knowledge of the trip is second-hand, gleaned largely from the cable traffic and conversations with only a few of the participants.

Following the discussion of the trip, the memo briefly considers the US objectives involved in international S&T activities generally, the functions that logically flow from these objectives, and some of the shortcomings of our current pattern of operations in performing these functions. This section is followed by a set of recommendations, and these are discussed in the final section of the paper.

II. THE AFRICA TRIP

A. Background

The idea of visiting four key African countries with a high-level S&T oriented delegation arose in OSTP and received early presidential endorsement. The trip was intended to have diplomatic value, to demonstrate serious US interest in helping these nations deal with the S&T problems affecting their development, and to gain a better understanding on the part of the participants of how Federal science capacities relate to the needs of these countries.

The countries selected all have special importance to the US. Newly independent Zimbabwe is a key factor in the stability of southern Africa, and has valuable natural resources; Nigeria is the most populous African state and is a vital source of oil to the US; Kenya is a stabilizing factor in eastern Africa and has recently agreed to provide increased access to US military craft; and Senegal is a leading francophone state, with a constructive and moderate leadership and strategic importance in terms of communications and transportation.

Kenya and Senegal have long hosted AID missions, Zimbabwe is the recipient of a modest economic support fund (ESF) to be administered by AID, and Nigeria is an AID graduate.

Planning for the trip began in April, involving intensive staff efforts to identify the areas of potential interest in S&T cooperation in the four countries, and the US capability to respond. OMB instructions made clear that funding for any programs which resulted from the mission would come from existing agency budget levels, or from the host country. In addition, the domestic agencies were subject to the usual constraint that their international activities must contribute to current program objectives, i.e. they must be consistant with

their domestic mandates.

An advance party from OES, AID, and OSTP made a preliminary visit to Africa in July and the main event took place during two weeks in late September. The delegation numbered around thirty people and was notable for the number of agency heads and Assistant Secretaries included. Non-government members of the delegation included the presidents of the National Academy of Sciences and Ohio State and Rochester Universities. The delegation did not include, notably, OMB or IDCA officials. (See Attachment A).

From reactions of host government officials and US ambassadors, as reflected in embassy cables, the delegation was warmly welcomed and the visit considered a great initial success. It is, of course, too early to measure the longer term results of the trip as follow-up activities are still largely at the planning stage.

B. Needs and Opportunities

Grouped below are examples of some of the topics which, from the cable traffic, arose on the trip. The grouping of these topics into five categories permits some general observations to be made about the means for dealing with them.

These examples do not necessarily reveal the dearest priorities of the host country officials. Effective advance planning and discussion served to channel interests into areas most likely to yield fruitful results.

Although serious discussions of each of these topics occurred, only a portion of them are reflected in the agreements signed on the visit (See Attachment B). The list does not represent commitments to further action in all cases.

1. Technology management. Modern technology often requires new and different policies, organizations and management practices for effective use. US experience in technological rule-making and organizational innovation was well represented in the delegation and much in demand as the following topics illustrate:

- Energy policy formulation in Senegal
- Environmental laws and regulations in Kenya
- Regulation of off-shore oil leasing and production in Kenya

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- Planning for the expansion of university systems in Nigeria
- Environmental impact statements in Nigeria
- Agricultural information systems in Kenya
- Management of dairy cooperatives in Senegal
- Health management planning in Nigeria
- Design of system for linking agricultural production, decentralized processing, and product grading in Kenya
- Organization of grants programs for scientific research in Nigeria
- Development of preventive health programs in Kenya
- Organization of high-quality research institutions in Zimbabwe
- Management and maintenance system for medical stores and equipment in Kenya
- Quality control procedures for pharmaceuticals in Zimbabwe
- Collection of energy statistics in Senegal
- Critique of Nigerian plans for an overall medical research program

2. Access to Technology. Possibly due to advance planning, there appeared to be little demand for free access to proprietary technology. Interest seemed strongest in gaining access to the application of advanced technologies to survey resources. For example:

- Assessing coal resources in Zimbabwe
- Evaluation of technical reports of the potential of an offshore heavy crude field in Senegal
- Seismic survey of offshore areas of Kenya
- Geothermal mapping of the Rift Valley in Kenya by aircraft
- Use of LANDSAT for settlement planning in Kenya
- Design of an oil spill contingency plan in Nigeria
- Soils survey in Nigeria
- Remote sensing for resources in Nigeria
- Natural resources evaluation in Zimbabwe

3. Problem-oriented Collaborative Research. Research collaboration was requested most frequently in the field of agriculture, health and energy. In many cases, collaborative programs are already underway with AID assistance or, as in Nigeria, under binational agreements between corresponding government agencies. Illustrative topics of priority interest include the following:

- Biomedical research on infection diseases, malaria, tuberculosis, leprosy, schistosomiasis, and onchocerciosis in Nigeria

- Operations research on family health project in Nigeria

- Fisheries research in Nigeria and Senegal

- Infectious diseases, nutrition and traditional medicine in Senegal

- Coal and metals mining in Zimbabwe

- Short-cycle maize varieties and food cash crops for marginal lands in Zimbabwe

- Energy research and development in Kenya

4. Technical Advice and Training. This category overlaps with the first --Technology Management--because the response to requests in that category could take the form of expert advice and/or training. This category contains areas of interest that are more technical than procedural, perhaps more typical of AID's usual pattern of assistance than the items in the first category. The topics listed in the cable traffic are numerous; a few illustrative examples are the followint:

- Senegal:

  - Training of personnel of the Oceanographic Research Center oriented towards fisheries assessment;

  - Training and advice on improving the quality of millet, vegetables and beans at the Food Technology Institute

  - Training middle and upper level staff for research and public health

- Zimbabwe:

  - LANDSAT training
  - Experts on animal health
  - Weather forecaster training
  - Training university staff

5. Equipment. Effective advance preparations dampened requests for equipment; the needs are extensive but the delegation had little means to respond positively. Nevertheless, even in the poorer countries, the priority seems to have been placed on "software" rather than hardware.

C. Follow-up measures.

Nineteen formal memoranda of agreement or intent were signed during the trip, almost half of them with Nigeria. (See Attachment B.) The range of actions possible under these agreements is broad, but in practice their scope will depend on future actions by both sides and the availability of funds.

The OMB instructions were strictly adhered to, but, with the President's concurrence, Dr. Press is seeking to have a total of $10 million earmarked from IDCA/AID and other agencies to ensure that meaningful follow-up action occurs. OMB is of the view that in countries where AID is active, i.e. all but Nigeria, AID should finance whatever activities ensue, assuming they fall within the AID mandate.

The Nigerians will undertake to finance all activities which benefit their country, except that the delegation agreed to the creation of a joint fund for financing specific project development. The source of the US contribution to this fund has yet to be determined.

For Zimbabwe, an allocation of $750,000 for S&T cooperation has been made from the $10 million ESF appropriation to that country. The State Department wishes to ensure that the fund is used to develop a set of relationships that deal both with the immediate tasks of reconstruction and resettlement and with longer-term mutual interests that may transcend those of the AID program.

In Kenya and Senegal, AID missions will be the coordinators and monitors of follow-up activities, although it was noted by members of the delegation that the AID program in Senegal is more attuned to S&T matters than the program in Kenya.

Within IDCA/AID are several potential sources of funds for follow-up activities, in addition to the ESF funds for Zimbabwe, including the following:

- AID mission budgets in Kenya and Senegal
- Africa Bureau funds centrally administered
- Development Support Bureau funds (DSB)
- The new S&T program budget of $12 million
- The proposed grant for an S&T program to the National Academy of Sciences (part of the above $12 million)

- Trade and Development Program (TDP), the reimbursable development program formerly in AID and now a separate component of IDCA. TDP has the authority to use a limited amount of funds to facilitate access to natural resources of interest to the U.S., and to stimulate programs which are likely to lead to substantial demands for US private or public goods and services.

With the possible exception of the funds available to the new IDCA/AID S&T program and the intended grant to the NAS, these potential sources of funds have been tightly programmed so that reallocations can be made for follow-up activities only at the cost of abandoning other desirable activities which are already far into the programming process. AID can be expected to take a hard look at the suggested new projects in terms of their relative contribution to the Agency's objectives.

D. Comments and Observations

The observations found here arise from the cable traffic and conversations with only a few of the participants. They need to be tested further.

1. The budget process. The trip appears to have been a considerable diplomatic success. Lasting benefits will depend upon successful follow-up activities, and arranging the financing for these will test the rigidities of our budget system. Here is a case where senior officials of US scientific agencies, the Department of State, and AID have shared an experience and generally agreed upon the actions which should follow. Even with strong White House support from Dr. Press, it may prove difficult to to execute the agreements signed.

This is an illustration of a dysfunctional aspect of our budgetary system. Activities were identified which would serve US foreign policy purposes because they are valued highly by the African nations, would serve the development objectives of the host countries, and could contribute to US interest in world-wide environmental quality, food and energy production, and disease control. Yet the State Department has no funds for these purposes, AID may quite properly find them too remote from its mandate, and DOE, USDA, NIH, etc. may find them unjustifiable in terms of their domestic priorities. There is no routine way in which the values of all three agencies interested in a particular activity (e.g. State, AID and DOE in an energy project)

can be combined to reflect the composite national interest.[2] In the case at hand, this difficulty may be surmounted because of White House interest in the results, but more routine opportunities of this sort would have no chance of fruition.

2. AID and the Technical Agencies. It could be argued that one should not place much value on the definition of action requirements emerging from such a trip because of its brevity. In countries with AID missions, projects developed by resident staff should be preferred, particularly since most of the topics which arose are within the sphere of AID interests: agriculture, health and energy.

For some categories of activities, this is no doubt the case. Requests under the headings 4 (Technical advice and training) and 5 (Equipment) should be handled by AID missions in the usual way. A number of topics arising in category 3 (Problem-oriented research collaboration) are also within AID's purview, although there may be value in involving the research resources of DOE, NIH and USDA more directly in their execution.

Many of the activities in categories 1 (Technology management) and 2 (Access to technology for surveying resources) would not, however, normally rank high in AID's country programming. They are recognizably important to the development of these countries, but they are not grass-roots activities, and their impact on the basic needs of the poor may be very indirect. Although such activities are not formally barred by the New Directions mandate, one senses that the dynamics of the Agency lead mission directors to prefer projects more clearly targeted on the needs of the poor.

Yet the US is almost uniquely qualified to assist African countries in many of these areas, and US interests in doing so go beyond the AID mandate. The US has an interest in the ability of these African countries to formulate effective energy policies and environmental regulations, to design management systems which improve their agricultural performances and promote their research competence, to plan their university systems, and to accurately assess their mineral resources. This doesn't mean the US should do these things for them, or pay the full cost of whatever assistance is required, but some recognition of US interest should be reflected in the allocation of costs; i.e. we

should be able to pay at least a portion of them when necessary.

AID could be authorized or directed to assign higher priorities to these advanced technological activities, but there are good arguments against doing so. First, it would take several years to acquire the technical staff to competently assess opportunities and to adapt its programming process to handle such matters expeditiously. Second, AID works in a limited number of countries, generally at the low income end of the scale, and the demand for cooperation on the management of complex systems is likely to be greater in the more advanced developing countries.

Third, AID's strengths lie in working closely with countries to mount effective programs to increase agricultural productivity, improve health services and find alternative sources of energy. For the most part, the technology involved need not be sophisticated, but an intimate knowledge of local culture, social structures and political configurations is required for programs to be effectively designed. Although it is possible for an organization to combine advanced technical knowledge with expertise in inter-cultural programming, in practice it is very difficult. AID can and does draw on the technical resources of other agencies through inter-agency agreements, but they tend to be used in the same way contractors are employed: to fulfill tasks designed by AID in terms of its mandate.

Representatives of the technical agencies on the trip say they would approach work in the fields of their expertise quite differently than AID is doing, but there was no inclination on their part to unleash the domestic agencies <u>en masse</u> and allow them to entrepreneur activities abroad. All recognized that some coordinating mechanism was needed and, when pressed, thought the State Department should play the role. But this raised the question of how State could acquire the requisite technical expertise and budgetary leverage.

This is one of the fundamental problems which this memo seeks to address: how can US S&T resources be enabled to play a greater role in achieving US objectives abroad (foreign policy, developmental, and substantive) in an efficient and effective manner?

3. The private sector. The role of government in stimulating private sector S&T cooperation was not a central focus of the trip, but the discussions the university people had with their counterparts illustrates another problem. African universities are still in the process of expanding and would value American cooperation in university planning, faculty development, research and teaching. Although such cooperation would appear to have substantial value in terms of foreign relations and development, US agencies are not presently in a position to be of much assistance. TDY has helped the Nigerian Government manage a large teacher training program in the US, but cannot assist governments which are unable to pay the full costs involved.

III. INTERNATIONAL S&T AND NATIONAL INTEREST

The potential contribution of international S&T activities to US national interests has not been systematically analysed and convincingly articulated. It is a complex subject, but one which deserves attention so that we can plan more rational use of our efforts and Congress can have a more coherent framework in which to consider executive proposals. The Congressional debate on the ISTC proposal, for example, dealt only peripherally with the merits of the functions the Institute was designed to perform. Another case in point is the US contribution to the UN Interim Fund for S&T in developing countries. The fund was a product of UNCSTD where the US delegation played a leading role in its creation. Subsequently, State and OMB cut the proposed US contribution by 60%, and even that amount is in danger of dropping from the budget. The US in both cases went on record in international meetings with pledges it is unable or unwilling to redeem. It might be possible to a oid such national embarrassment if we had a comprehensive policy framework for international S&T cooperation to which both Executive and Legislature subscribed.

The chances that both branches of government could subscribe to such a policy would improve if both participated in its conception. A year ago I proposed that a presidential commission be set up, with congressional participation, to elucidate US objectives in this area. The onset of a new presidential term could be a favorable time to launch such an effort.

A. Objectives

Here one can only list the type of US objectives involved, without assigning them weights. It is a familiar listing.

1. Foreign relations. US relations with developing countries in general are not at a high point. In many international fora we find ourselves in opposition to the majority of nations represented over economic or political issues. These disagreements are unlikely to be resolved any time soon.

Increased cooperation on scientific and technological matters won't solve the issues on which there is fundamental disagreement, but it could mitigate the impression which seems to be growing in the Third World that the US is obstructionist and basically uninterested in their advancement. The efficacy of US science and technology is perhaps the most universally admired characteristic of our nation. Leaders of developing countries recognize that in the absence of a global redistribution of wealth or the discovery of oil beneath their soil, technological advances offer the only path to improving the wellbeing of their people.

There are, of course, some industrial technologies which we do not wish to share, but most of the technologies required by the Third World for industrial advance, agricultural development, improved health and lowered fertility, energy production and environmental control are in our interest to help them acquire. The acquisition process is generally not a simple matter of transferring technologies off the shelf; each nation has a particular set of economic and geographical characteristics to which technology should conform. But helping countries improve their S&T capabilities so they can better deal with their own problems must be one of the most constructive and inexpensive ways of improving the US posture towards them.

There have in the past been attempts to use international S&T cooperation to solve regional political problems, such as President Johnson's plan for the Mekong River development a la VA and the nuclear-powered desalinization scheme for arid Middle Eastern countries proposed by another Johnson during the Eisenhower administration. It is generally agreed that S&T

cooperation lacks the power to resolve such heated disputes. Congressman Waxman's suggestion that the US use S&T cooperation "at an appropriate time" to help "build the structure of peace" in the Middle East is, however, another matter. Regional cooperation re-inforced by joint S&T activities can offer powerful economic as well as political benefits.

2. Economic. Potential economic benefits to the US from S&T cooperation are both direct and indirect. Germany and Japan assist their industries to sell and invest in the Third World to a greater extent than do we, recognizing the long-term benefits from the newly industrializing countries' utilizing their products. Drucker points out, in Managing . in Turbulent Times, that Germany and Japan have in the past 20 years analysed trends in the world economy and acted to shape their own accordingly. In contrast, the US and UK continued to manage their economies as autonomous units and achieved the worst performances of all industrialized nations in the '60s and '70s. Economic interdependence is a reality which we seem late in recognizing.

Drucker also counts the newly industrializing nations as the major factors in the world economy in the next two decades. He believes that their success in attaining full economic development will largely determine the success or failure of the entire world economy in the next decades.

Saying that the Third World economies are of growing importance to the US is, of course, easier than describing what we should do about it. The point is that we need a coherent policy response to this situation and we lack the analytical unit to formulate such a policy.

3. Development. The role of S&T in development has received a great deal of attention in the past two years, particularly by the group engaged in planning the ISTC. Although that effort has yet to succeed, IDCA and AID are moving vigorously to strengthen the S&T component of the foreign assistance program, particularly in the fields of food production, health and population, and energy.

4. Global problems. A number of global problems threatening the quality of life on this planet will require international S&T

cooperation if they are to be resolved. The Global 2000 Report to the President summarized our knowledge of the trend lines for world food production, population growth, health status, energy production and environmental quality. None is beyond the wit of mankind to deal with, but neither are current trends reassuring.

These are problems of greater importance than urgency--they won't yield to crash programs, they will seriously affect the lives of our children and grandchildren, but they can be, and often are, deferred by governments with more immediate interests.

Two potentially significant initiatives are currently in the planning stage in the government. A task force under the leadership of the Council on Environment Quality, an agency under threat of extinction, is charged with designing follow-up measures to the Global 2000 report. It is difficult at this stage to gauge the likely importance of that effort: much will depend upon the priority assigned to it by the incoming Administration, but at minimum it should result in improved Federal capacity to monitor and analyse world-wide trends.

The other initiative is the so-called Leadership Proposal being prepared by IDCA for special attention to alleviating hunger, stemming population growth, and meeting energy needs. This proposal, if adopted, would lead to substantially increased S&T cooperation with Third World nations.

The details of the Leadership Proposal are still classified and do not in any case need to be analysed here. It can be pointed out, however, that the proposal is put forward in the context of the foreign assistance program. This, to me, raises conceptual, political and practical problems.

Conceptually, it is not entirely accurate to credit US activities on these matters entirely to the foreign assistance account. The problems involved are of concern to the US as well as to the developing countries, and our cooperation with them is not strictly foreign aid. Both sides will contribute, and both expect to benefit.

Politically, the foreign assistance designation holds few advantages in selling the merits of the effort to Congress or the public. The foreign aid label may obscure the vital long-range interests of the US in doing more about these problems.

Practically, the foreign assistance context leaves action responsibility for the added effort in the hands of AID. It is no criticism of the Agency to point out that the greater depth of technical competence possessed by the government in these fields is to be found in USDA, HEW/NIH and DOE with its associated laboratories. It is true that AID can tap these resources through interagency agreements, but these arrangements tend to be treated by the technical agencies as service functions, not in the mainstream of their activities. Until the technical agencies are given the mandate to concern themselves with global problems, they are unlikely to accord them the importance they deserve.

It should be noted here that USDA has a broader mandate with respect to world food production, and last year, for the first time, it received a modest budget with which to develop international cooperation. This is a promising beginning, although it is far from a comprehensive approach. For example, research priorities of USDA research institutions, the formula funding program for land-grant institutions, and the competitive grants program do not take into account developing country research needs, and the Department plans to initiate cooperative programs abroad only in non-AID countries.

Another practical difficulty of the foreign aid label is AID's limited geographical scope. We are presumably interested in food production, energy creation and fertility control in middle-income countries, such as most of South America, as well as in the poorer countries of the world. IDCA itself is not so constrained, but it is not clear what instrumentality IDCA would use in cooperating with these countries if it were not AID. On the other hand, if AID was the chosen instrument, some resistance could be anticipated from the middle-income countries who would welcome cooperation on matters of mutual interest but reject the old donor-donee relationship which they properly believe themselves to have outgrown.

5. Knowledge. International S&T activities can yield knowledge of benefit to the American people, and of value in assessing future priorities. Developing countries have the lead

in relatively few areas, such as gasohol production in Brazil, but through cooperation US farmers may benefit from arid lands research done abroad, new species development, and less energy- and capital-intensive farming systems. Similarly, in the health field, cooperative research offers opportunities for field research on diseases that can only be studies in the laboratory domestically.

B. Functions

From the above discussion of the Africa trip and US objectives in international S&T activities more generally, it appears to me that the US needs to improve its functional capabilities in the following respects:

1. Policy articularion. We need better means of defining and articulating US interests in international S&T cooperation for the edification of Congress and the American public as well as to form a basis for more effective programming. This should be done with the participation of members of Congress and knowledgable individuals from the private sector. A presidential commission is one possibility; failing that, the international advisory committee assembled by Dr. Press to guide ISTC planning could be reactivated and reconstituted for the purpose. A review of US objectives, and progress in achieving them, should take place periodically, say every four or five years, by the commission or advisory committee.

2. Strategy analysis and planning. A unit is needed which can devise the means for achieving the defined objectives. Choices need to be made on the division of labor between multilateral and bilateral efforts, public sector or private sector programs, and AID or technical agency responsibility. Such choices are preferably made by a group with no vested interest in the assignment of responsibility among agencies. An interagency committee would perhaps be the least desirable mechanism for such a task.

3. Monitoring and information. The Global 2000 study revealed that the various US agencies seeking to track worldwide developments on problems such as food and energy production and population growth have been using different and sometimes irreconcilable assumptions in their models. The CEQ task force will, one assumes, rectify that difficulty and provide for some central means of keeping the Executive Branch abreast of trends.

An analysis of information assembled by this process will reveal gaps in needed knowledge. A central information unit should have the ability to foster research by government or private agencies to fill the gaps.

4. Budgetary flexibility. The means should be found to provide funding for international S&T activities which serve foreign policy purposes by responding to the priorities of developing countries. These would include cooperative research programs with the middle-income countries, and cooperation with the poorer countries on technological matters outside the mandate of the AID program.

5. Broaden the international involvement of the technical agencies. A global concern for food production, health, energy and environmental quality must gradually come to the fore in the respective technical agencies. Increasingly, it becomes irrational to confine the nation's major technical resources to a domestic focus.

6. Engage the private sector more fully. Most of the US objectives relating to international S&T can be as well served by US private sector activities as by direct government action. Means need to be found to stimulate more international activity by the nation's industries, universities, foundations, and private research organizations.

IV. RECOMMENDATIONS

My principal recommendation is that the US make more use of the nation's main strengths, its scientific and technological capabilities, in coming to grips with the reality of an interdependent world. We are unable to meet the demands of the Third World for massive resource transfers, and we doubt the wisdom of many of the measures they suggest for reforming the international monetary system. But we can in good faith and at tolerable cost assist those nations in building their capacities to deal with their own problems, and bring a greater share of our intellectual skills to bear on long-range global problems which are in everyone's interest to resolve.

It will take time for our government to make the changes implied by this suggestion, time to formulate and refine feasible objectives and to forge new relationships among US agencies and with developing countries. But most importantly, it will take time to convince the Congress and the public that an S&T centered policy is in the national interest.

I would suggest a three stage process over a number of years. The first stage, for two or three years, would be devoted to getting the most out of current arrangements and laying the groundwork for stages two and three. The second stage, lasting somewhat longer, would center around a born-again ISTC with more of a "global problem" than a "development" orientation. The third stage would signal the full integration of world-wide concerns into the working agendas of our technical agencies.

A. Stage One

Leadership in this stage would rest heavily on the directors of OSTP and IDCA, and on the IDCA/AID science advisor, but concerted action would be required by a number of agencies. For convenience, suggested actions are keyed to the functions listed in the previous section.

1. Policy articulation. OSTP should take the lead in organizing a commission or committee to articulate US international S&T objectives in a cogent and convincing manner.

Thereafter, OSTP would seek presidential endorsement of the objectives, and find the means to inform and educate the congress on them. One device could be inclusion of the subject in a presidential address to Congress, such as the State of the Union message.

2. Strategy analysis and planning. IDCA would be the lead agency here, and the science advisor the principal actor. IDCA should seek to define its image as coordinator of S&T (and other) relationships with developing countries, and not as the head office for the foreign assistance program. Priority actions would include:

a. Revise the Leadership Proposal in cooperation with USDA, HHS and DOE to engage their more active participation in in program.

b. Determine international research priorities relating to food production, health, contraception, energy and environment.

It is alleged by many knowledgable people that agricultural and contraceptive technologies, for example, are bumping up against the limits of our knowledge of basic plant and human physiology. We need to place greater emphasis on more basic research to facilitate further technological advance. This is a question requiring expert judgment.

The most comprehensive effort to devise an international research agenda in a field was the World Food and Nutrition Study undertaken by the NAS. That effort was encyclopedic, but it had a disappointing impact on government action, probably because on one in government was in a position to systematically follow its guidance. (The IDCA science advisor can be in such a position.) The WFNS was perhaps too elaborate an exercise to serve as a model, but some similar effort to establish priorities should be undertaken in all major fields. The NAS would again be the logical body to undertake these efforts, and funding would be available under the proposed new AID grant.

c. Work to gain recognition of international priorities in the research agendas of technical agencies, particularly USDA, NIH, DOE and EPA. Lacking a budget for this purpose, the impact on these agencies by the science advisor may be limited. He can, however, stimulate their interest and ensure that AID's centrally-

funded research builds on the work being funded by other government agencies. For example, research on biological nitrogen fixation is funded by NSF, USDA and AID, but the efforts are not coordinated.

d. Build links between research arms of the technical agencies and their counterparts abroad, particularly in middle-income countries. Part of the science advisor's $12 million annual budget could be used to establish cooperative linkages for very little cost, mostly travel funds. DOE, for example, has 50,000 scientists and a $7 billion research budget. It has no priority interest in developing international links unless they contribute to domestic objectives, but it would willingly respond to opportunities for cooperation if they were well crafted and financed by IDCA. A high level of technical expertise in the energy field would of course be required if DOE research capacities were to be effectively accessed.

e. Serve as an international contact point for access to US research capacities. UN agencies and research organizations in developing countries often have difficulty in determining appropriate contact points in the complex world of US S&T. The office of the science advisor could serve as a focal point to facilitate international contacts.

f. Cooperate with US science attachés. Science attachés could become the focal points for access, through IDCA, to Federal technical competences. Unfortunately, few are assigned to developing countries; in black Africa, for example, there are none. The State Department should be urged to enlarge its roster of science attachés with particular attention to middle-income countries. They should then be acquainted with the possibilities for technical agency response to requests for cooperation, on such matters as arose in categories 1 and 2 on the Africa trip. The IDCA science office budget or TDP should be enabled to supply incidental expenses for exploring opportunities turned up by the science attachés.

g. After a year or 18 months, begin planning for an ISTC.

3. Monitoring and information. The CEQ task force will presumably result in improved monitoring and forecasting capabilities in the technical agencies and a small White House unit to keep the President informed. If that is not the result, OSTP could take the lead in stimulating the technical agencies to sharpen their global perspectives and build on reconcilable assumptions.

4. Budgetary flexibility. OSTP and IDCA should explore with OMB the possibility of devising more liberal guidelines for the expenditure of technical agency funds abroad. One could not go far in that direction without reference to congressional appropriations committees, but more flexibility on the use of travel funds, for example, would make international cooperation more possible.

Priority should be given to enlarging the TDP program budget. That program has great potential for increasing S&T cooperation with middle-income countries, if its funds are imaginatively used.

Another source with good potential is economic support funds (ESF). ESF at the moment is a rather blunt instrument, but the principle is sound. The State Department determines when the US has a priority foreign policy interest in providing economic support for a country and initiates requests to the Congress. The funds appropriated for ESF are then routinely turned over to AID for administration. Recently, with AID concurrence, State/OES negotiated an agreement with Egypt which would allow a small portion of the ESF allocation for that country to be devoted to S&T cooperation outside the AID program.

That could be a useful precedent. As the State Department decides which countries should receive ESF and in what amounts, it could also determine the portion to be administered by AID and that which could be administered by IDCA through the technical agencies. AID understandably does not welcome other agencies' determining the application of funds entrusted to it, and the other agencies don't devote their best efforts to projects designed for them by AID. The solution may be not to turn the funds over to AID

in their entirety.

A possible logical extension and refinement of the ESF program would be to request Congress to designate funds for international S&T activities for foreign policy purposes, not attached to a particular country. These funds could be assigned to IDCA for administration in regions or on topics identified by State/OES as being of particular foreign policy interest. IDCA could employ the funds by generating and supporting international activities by the technical agencies. The science attachés would be instrumental in helping OES define its priorities for the program. This would remedy a serious deficiency in our present system, i.e. that foreign policy interests in S&T cooperation have no means of budgetary expression.

5. Broaden the international involvement of the technical agencies. This, of course, is the central long-range objective of this paper and suggestions of ways to begin are found among the above paragraphs. It seems to me inevitable that as the global crises already on the horizon worsen, and the world becomes ever more interdependent, the principal technical resources of this country will become more internationally engaged. To move gradually but firmly in that direction, we should now take measures to raise international cooperation on the agendas of the leadership of these agencies, and make clear that they will eventually have global responsibilities. They can begin now to strengthen their information systems on global problems, review their research priorities with international needs in mind, and plan the gradual expansion of their scope.

6. Engage the private sector more fully. This is a tough but important issue which deserves more attention than I have so far been able to give it. At this point it seems that the most promising instruments for increasing private sector involvement are TDP, for private industry, and the NAS, for the universities, foundations and private research organizations. The participation of those two bodies in mapping strategies should be invited, perhaps by the IDCA/AID science advisor.

One strategy commends itself at this point: to find ways for joint planning of activities by the private sector and the government. It is unlikely that programs wholly conceived in

government will generate the level of responsible participation of private groups which would be desired.

B. Stage Two

It is difficult not to conclude that the failure of the ISTC to win the support of the Congress was a very considerable loss. The suggestions for action in Stage One outlined above for the most part involve activities which would have been the responsibility of the ISTC. In its absence, a tremendous burden devolves on the office of the IDCA/AID science advisor. Within a year or two, another attempt to create an ISTC should be made.

Next time, however, the Institute should be less identified with foreign assistance and more explicitly focused on global problems. It could still appropriately be located within IDCA, assuming IDCA succeeds in becoming more than a development agency, and S&T for development could be important in its work, but it should be recognized that our interests in food, energy, population, health environment and industrialization transcend our concern for poverty.

It will be important in planning for ISTC II to engage the direct participation of the technical agencies. The ISTC will represent a way station on the path to global mandates for these agencies and they should help shape the institution in such a way as to facilitate their participation in its efforts.

By the time of its creation, we should have succeeded in better defining our international objectives and establishing research priorities. The ISTC will be needed to mount programs and fund research accordingly, often through the technical agencies themselves.

C. Stage Three

In time, we should have the experience and awareness required to assign primary responsibility for dealing with global problems directly to the appropriate technical agencies. Central coordination would still be necessary because of the inter-related nature of the problems, but the agencies should have international mandates and budgets to permit them to act on their own. ISTC can become a policy and evaluation unit, quite removed from day-to-day operations.

All of this assumes that the interests and knowledge of Congress have grown to the point that it shares an awareness of an interdependent world that renders our present allocation of responsibilities obsolete. It will be a continuing task of the Director of OSTP to promote that learning process.

Footnotes:

1. For substantive discussions of priority problems, the government documents most helpful are the ISTC Congressional Presentations of 1979 and 1980, the Global 2000 Report to the President, of 1980, and the FY 1981 IDCA budget presentation (classified, but with an unclassified annex on S&T).

2. See papers on the budgetary system problem by Eugene Skolnikoff and Courtney Nelson (titles and dates to be added).

E

Prospects for Improved Contraception

By Linda Atkinson, S. Bruce Schearer, Oscar Harkavy and Richard Lincoln

Some important new birth control methods have been developed in the postpill, post-IUD era; others are on the way. But shrinking dollars for research (especially R&D), inadequate coordination and planning by donors and programs, and costly and complex regulatory requirements frustrate efforts to use current knowledge to make major breakthroughs.

Introduction

Like most revolutions, the contraceptive revolution disappointed some whose expectations of it were unrealistically high. Two decades ago, when the oral contraceptive was brought to market and the IUD was reborn in antiseptic plastic and stainless steel, many scientists voiced optimism that that was only the beginning. A new reproductive age was said to be dawning, and it would not be long, we were told, before the perfect contraceptive would become available—highly effective, safe, acceptable, inexpensive and simple to administer and distribute. By now, it is generally recognized that there can never be such an ideal contraceptive, and that an array of methods is needed for people who live under different circumstances and have differing preferences and requirements. Each method has its unique advantages and drawbacks, and it is likely that there will always be some trade-off between effectiveness and risk.

Granted all these qualifications, the distance from the scientist's imagination to the couple's bedroom has proved to be greater than some had believed. The arrays of vaccines, menses inducers, male pills and chemical sterilants first heralded a dozen or more years ago are for the most part still in early stages of development—for want of money, knowledge, manpower or all three. Not a single new contraceptive chemical entity has reached the marketplace since the introduction of the synthetic steroid norgestrel in 1968. What is more, the need for improved contraceptives has become ever more acute as the reputations of the pill and the IUD have been tarnished by an accumulation of medical reports indicating that while they are not nearly as dangerous as some had feared, neither are they as safe as some had hoped.

Population growth rates in developing countries (where three-quarters of the world's people live) remain high, implying a doubling of the 3.3 billion inhabitants of Third World countries in the next 34 years, slowing progress in economic and social development.[1] In most developing countries, more than half of women of reproductive age want no more children, but typically, two-thirds of them are not using any means to prevent childbirth.[2] Even in highly developed countries, where contraceptive practice appears to be nearly universal, unintended pregnancies remain common. In the United States, for example, an estimated 2.8 million unplanned pregnancies occur each year, half of them terminated by induced abortion.[3]

Does all this mean that the contraceptive revolution itself was aborted? Although we have not been propelled from the contraceptive stone (or rubber) age directly into a High-Tech, perfectly contracepting society, neither have we stood still in the development of more effective and safe birth control methods and in their successful wide-scale use.

Among the new methods marketed since the pill and IUD made their debuts 20 years ago are outpatient female sterilization by means of laparoscopy and minilaparotomy, simplified aspiration abortion, copper and hormone-releasing IUDs, long-acting injectable progestational agents, prostaglandins for second-trimester abortions and — not least in importance — a much safer but still highly effective oral contraceptive, with just a fraction of the dose of steroid hormones contained in pills marketed two decades ago. What is more, long-acting hormonal implants, vaginal rings, new injectable preparations, prostaglandins to induce early abortions, IUDs causing less bleeding and pain and cervical caps are in advanced field trials with thousands of women, and should be widely available within the next three to five years. Somewhat further down the line, but with an excellent chance of being introduced into wide-scale use, are long-acting biodegradable steroidal implants that do not require removal. By any standard, these technological advances constitute a considerable improvement in the available contraceptive repertoire.

Increasingly widespread utilization of the most effective modern methods of birth control associated with vigorous national family planning programs in a number of developing nations — including some very populous ones such as China, Indonesia, Mexico and Thailand — have helped bring down birthrates and explosive population growth rates dramatically. Although specific estimates differ, there is now general agreement that the rate of population growth in the developing world has been slowed, and that barring unforeseen safety problems with current methods or significant alterations in the social climate, the trend toward further decline in growth rates is likely to continue.[4]

Unprecedented control over reproduction (however still imperfect) has helped women

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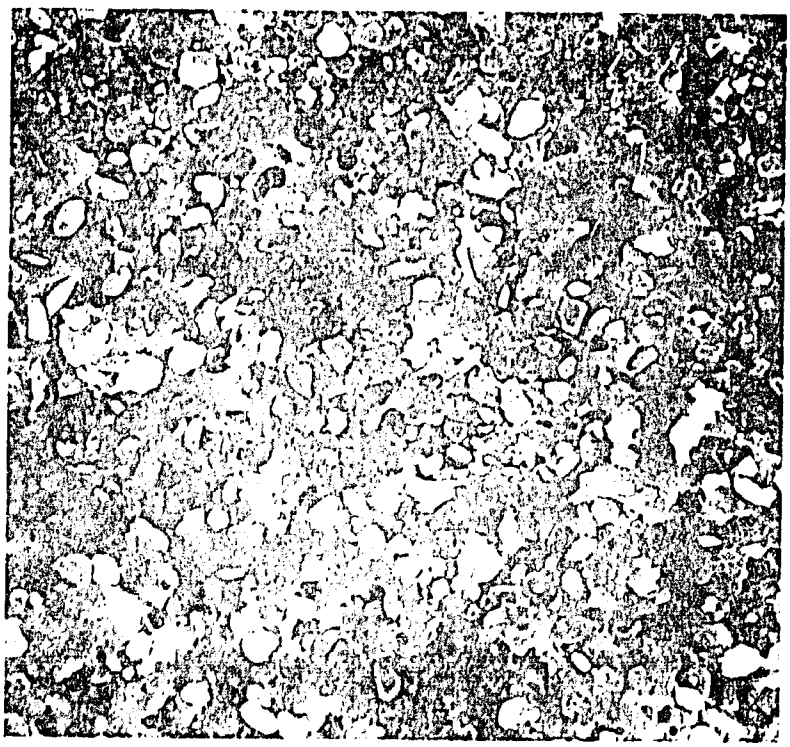
to take advantage of opportunities for educational and economic advancement and to press for realization of those opportunities where they are not available. The strong pressures exerted on the scientific community to find safer alternatives to the pill and the IUD are themselves evidence of the growing power of the women's movement, which, in turn, has been spurred by the availability of these very methods.

It seems almost certain that with improved service delivery programs employing currently available methods, birthrates will come down even more rapidly in the years to come as couples are enabled to improve control over their own reproduction. The decline will be especially marked if the "not to end" liberalization of sterilization and abortion laws and policies continues. As has been noted in recent country studies, not only do family planning programs help couples to have the number of children they desire, but the very success of these programs appears to influence them to reduce their family sizes ideals, especially when combined with very modest improvements in level of modernization and women's status, are occurring simultaneously.[7]

The very large number of unintended pregnancies and births that continue to occur in countries where all current methods, including abortion and sterilization, are widely available, however, is evidence that today's methods are not sufficient to enable couples to realize their reproductive intentions even under very favorable circumstances, much less under conditions where storage, distribution and administration of contraceptives are problems.

Oral contraception, the IUD and sterilization are the cornerstones of current service delivery programs. The pill, although highly effective, is considered unsafe for older women who smoke or have other conditions (such as obesity or high blood pressure) that place them at high risk of cardiovascular disease. The advisability of the IUD, on the other hand, is questionable for young women who have not yet begun childbearing, because of the danger, however small, of infection that might compromise future fertility. Widely publicized information about health risks — sometimes sensationalized — has led a number of young women in developed countries such as the United States to abandon the pill and the IUD. Many of these women have switched to traditional, less effective methods, depending on legal abortion as a backup in the event of contraceptive failure. As family planning programs expand, pill and IUD use in developing countries continues to increase, but both acceptance and continuation rates are undoubtedly affected by adverse publicity. In any case, discontinuation of both methods is often relatively high, and their extended use effectiveness is below that obtained in clinical trials with highly motivated users. Both effectiveness and continuation of use are lower in developing than in developed countries, reflecting such adverse social conditions as poor health services, low income and low education levels. As a result, it is not uncommon in Third World countries to see pregnancy rates associated with these methods that are many times higher than those recorded in developed countries, and first-year discontinuation rates in developing countries run as high as 20–40 percent of new pill and IUD users.[8] There are even more problems of acceptance and consistent long-term use with coitus-related methods. Although the demand for contraceptive sterilization outruns the technical and logistic capacities of many developing countries to provide services, couples often turn to this permanent method only after failing to prevent unwanted births with reversible methods. Without the backup of induced abortion, as we have noted, the incidence of unplanned births would be more than twice as high as it is, even in a country such as the United States where contraceptive use is widespread. And it is unlikely that the political and religious controversies over abortion will be settled in the foreseeable future. In a number of countries, especially in the Muslim world, it is probable that abortion will remain illegal for some time to come.



A "new" contraceptive product might be marketed in three years: a porous implant surface.

Under these circumstances, it seems unlikely that the present technological base for birth planning will be adequate to support the addition of 500–600 million more users over the next few decades. New reversible methods for men and women, as well as less intrusive and simpler means of sterilization, continue to be desperately needed in industrialized and in developing countries.

What is the current state of contraceptive development, and what are the prospects for the future?

The Contraceptive R&D Process

Producing and marketing a new contraceptive involves investment in six major types of activity: the training of scientists to conduct research and the support of those institutions that educate them, basic scientific research in reproduction, mission-oriented research, applied research and development (R&D), product introduction, and evaluation of the effectiveness and safety of methods in use.

For any type of research, basic or applied,

the training of scientists and support of the academic institutions that produce them is essential.

Basic research from a wide range of scientific disciplines is the source of fundamental knowledge needed to supply leads for development of contraceptive methods. It is generally undertaken without an applied objective in mind, and includes laboratory, animal and field research devoted to improving knowledge about reproductive processes.

Mission-oriented (or directed) research generally refers to efforts aimed at accomplishing a specific contraceptive end; examples include a means of arresting spermatogenesis or a luteolytic agent. Mission-oriented research may include both basic and applied efforts, and may be conducted simultaneously in academic institutions and applied R&D organizations. (For example, efforts to develop a male pill may involve toxicology and efficacy studies by R&D organizations even as fundamental studies of the male reproductive physiology are undertaken to elucidate how points in the reproductive process might be interrupted to provide a more effective means of fertility control.)

The direct source of new products and technologies is applied R&D, which endeavors to utilize fundamental knowledge and understanding to develop new materials, new techniques and new processes in order to create a new product. Narrowly defined, applied R&D consists of using scientific research procedures in conjunction with engineering and manufacturing capabilities to design, test and refine new prototype products. In the case of applied R&D directed at obtaining new contraceptive methods, the major organized R&D programs are currently being conducted by more than a dozen private pharmaceutical companies, by three nonprofit R&D organizations, by a UN agency and by a U.S. government agency. In addition to the work they carry out within their own institutions, these organized R&D programs also use grants and contracts to fund a wide variety of other organizations to perform specific applied R&D tasks.

Product introduction converts a newly developed prototype product into a widely available manufactured item. This final step of the overall contraceptive development process comprises product acceptability and marketing studies, design and engineering of production plants, pilot trials of formulature, package design, regulatory filings, establishment of distribution channels and other activities designed to ensure local introduction and use of new products. Product introduction activities are sometimes defined and conducted as part of the applied R&D process. In other instances, they are viewed as part of the family planning service delivery system or of private-sector marketing, distribution and sales systems.

A sixth type of scientific activity — evaluation of the performance of existing contraceptive techniques — complements and provides an essential frame of reference for the contraceptive development process. It entails epidemiological research and is generally conducted by government agencies or by specialized nonprofit groups in collaboration with universities and health centers. Studies of existing methods provide benchmark information on the safety, health effects and effectiveness of products in current use.

While this article touches on all aspects of reproductive research and contraceptive development, its main focus is on applied R&D and on public-sector support for developing new contraceptives.

Funding and Organization

Reproductive and contraceptive research did not benefit from the rapid expansion of funding for biomedical research by the governments of the United States and other industrial nations in the two decades that followed World War II, largely because of the traditional taboos against the study of sex and reproduction and the moral and religious controversies over government involvement in birth control. Indeed, until 1959, the U.S. National Institutes of Health were prohibited from supporting research having any explicit relationship to birth control. (Today, the controversy over abortion similarly inhibits research in that area.) During the 1950s, biomedical research in the field of reproduction was largely funded by two major private foundations — Ford and Rockefeller — and a few individual philanthropists.

The oral contraceptive was developed with the support of private philanthropy and some sectors of the pharmaceutical industry, but without any government funding. By the mid-1960s, however, worldwide concern about the problems caused by rapid population growth spurred increased support for research to find better birth control methods.

In 1967, an Office of Population was established within the U.S. foreign assistance agency, the Agency for International Development (AID). While most of its funds are expended for family planning service programs, 3.5 percent of its budget has gone for research related to contraceptive development.* The Center for Population Research (CPR), now the major source of funds worldwide for reproductive and contraceptive research, was established as part of the U.S. National Institute of Child Health and Human Development in 1968. In 1969, the United Nations Fund for Population Activities (UNFPA) began its large multinational population assistance efforts. Its investment in fertility regulation research has never exceeded one-half of one percent of its budget, and has been used mainly for institution-building, although very recently, UNFPA has begun to make small expenditures for contraceptive development through annual contributions to the Human Reproduction Programme of the World Health Organization (WHO).

During the late 1960s, other developed countries — Britain, Canada, France, Sweden and West Germany — also began to fund reproductive and contraceptive research. Smaller efforts — most of them supported by international assistance agencies — were undertaken in some developing countries; the largest of these was in India.

The result of this increased concern can be seen in Figure 1 (page 178) and Table 1 (page 179). Funding for all aspects of reproductive and contraceptive research rose rapidly, from an estimated $31 million in 1965 to $117 million in 1973. Although this total research budget has continued to climb as measured in current dollars (to an estimated $155 million in 1979), expenditures corrected for inflation peaked in 1973. By 1979, constant-dollar expenditures were below what they had been in 1971.

Although U.S. government contributions for reproductive research have been increasing since the mid-1970s in constant as well as current dollars (see Table 2, page 179), the investment of private philanthropies has declined somewhat and contributions of other governments apparently have not grown. The investment of the private pharmaceutical companies is believed to have plateaued in the late 1970s at about $14 million (current dollar figures not shown in table) and apparently has declined in constant-dollar terms because of increased concern about the profitability of investment in research into new methods.†

The U.S. government is currently spending about $89.3 million for all types of reproductive and contraceptive research, contrib-

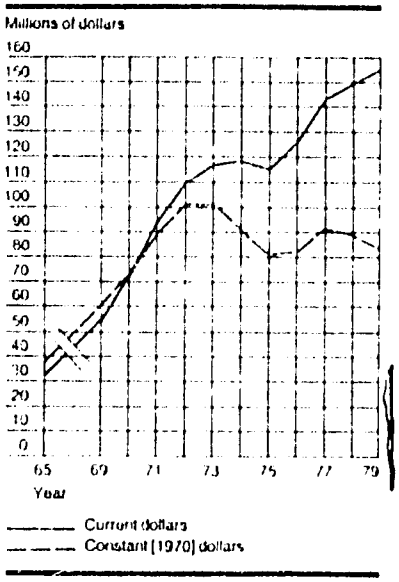
(Continued on page 178)

* A very small proportion of AID's research expenditures have been for specified basic research believed to offer promise of generating new leads for applied contraceptive R&D (e.g., prostaglandins and thyrotropin releasing hormone research).

† Various data from governments other than the United States and from pharmaceutical companies are not available after 1976. There is some indication that the efforts of private industry may have increased during the last two years because of interest in a few specific research areas, especially in the brain hormones.

(*Continued from page 173*)

Figure 1. Worldwide expenditures for reproductive research, 1965–1979



uting primarily through the CPR with smaller amounts expended through other of the National Institutes of Health and the AID. The proportion of total world funding for reproductive research provided by U.S. government agencies has increased from just 30 percent in 1965 to 35 percent in 1970, 45 percent in 1975 and 58 percent in 1979. Private philanthropies and nonprofit agencies, which accounted for about one fifth of total funding in the latter half of the 1960s and the early 1970s, are now responsible for less than one-tenth of total research expenditures. U.S. industry, which financed about one-quarter of reproductive research in the late 1950s, was, by the late 1970s, believed to be responsible for less than one-tenth of expenditures.

Although all aspects of funding for reproductive and contraceptive research have declined when measured in constant dollars, it is the expenditures for contraceptive development that have fallen most sharply, as may be seen in Table 3 and Figure 2 (page 180). Whereas about 30 cents of every dollar spent on reproductive research went into contraceptive development in 1974, only about 23 cents per dollar was spent for this purpose in 1978 (the most recent year for which data are available). Even in inflated current dollars, funds for contraceptive development have not increased. (They were about $35 million in 1974 and $33.7 million in 1978). Although expenditures by pharmaceutical companies may have increased somewhat in the last two years, it is notable that public-sector funding for contraceptive development has clearly declined since the early 1970s. At the present time, only 15 percent of all reproductive research financed by governments, private philanthropies and multinational organizations is devoted to contraceptive development.

In 1974, the authors of a Ford Foundation-sponsored study estimated that funds for applied contraceptive R&D would have to be increased by three times to take advantage of leads developed through basic research.[7] Today, expenditures in constant dollars are only three-quarters of the extremely inadequate 1974 levels (see Figure 2).

Yet basic science has uncovered numerous new leads in the 1970s — most spectacularly, Guillemin and Schally's Nobel-prize-winning work on releasing factors, which has opened up new opportunities for applied research that could lead to revolutionary new birth control methods for men and women (as well as new means to stimulate fertility in the infecund). Expenditures for basic reproductive research and for training new scientists, which were estimated in 1974 to be at about 40 percent and 30 percent, respectively,[8] of what were then current needs, have not done as badly as support for contraceptive R&D, but they, too, have not grown rapidly enough to do much more than keep pace with inflation. Expenditures for evaluation of the safety of current fertility control methods — estimated in 1974 to be just at 15 percent[9] of the levels needed to protect the health of users — have remained about the same in current dollars, but have declined by more than one fifth when inflation is taken into account. This decline has occurred despite the widespread publicity given to safety problems associated with available modern methods.

Given the failure of funding institutions, both public and private, to meet the challenges documented by the 1974 Ford Foundation study, it is perhaps remarkable that the postpill, post-IUD phase of the contraceptive revolution has been as successful as it has. And it is not at all surprising that expenditures for research into new methods of contraception have tended to be restricted to so called low-risk efforts promising relatively quick returns with minimum investment.

Public-Sector Contraceptive Development

During the late 1960s and early 1970s, the foreign assistance agencies of governments in several developed countries, two private U.S. foundations and one multilateral agency* took steps to create new public-sector programs to help develop new birth control methods. These programs were financed mainly through foreign assistance funds, since their primary purpose was to contribute to a foreign policy goal: namely, a reduction in unwanted births and an improvement in the individual health and well-being of couples in developing countries through provision of more appropriate birth control techniques than those currently available.

The rationale of the principal donors was based upon their realization that technologically feasible improvements in birth control techniques could contribute to improving individual health and well-being while reducing rapid population growth rates in developing countries. Unwanted fertility in these countries not only constituted a substantial proportion of childbearing, but also was viewed as hampering the efforts of national governments to improve the social, economic and health conditions of their people.

The donors recognized that private industry, which had traditionally been depended upon to develop new drugs and medical devices, had little incentive to develop birth control products geared to the special needs of developing-world couples because of what was perceived as poor profit potential offered by such markets. National medical research councils in developed countries, despite their growing interest in reproduction, concentrated almost all of their efforts on fundamental research. What is more, their priorities were determined mainly by the health needs of their own people, rather than by the needs of people who live in developing nations.

Few developing countries had (or have) national medical research councils focusing on reproduction or contraception (an exception is the Indian Council for Medical Research); those that did generally lacked the scientific capacities for highly technical applied R&D efforts. With the experience before them of international public-sector programs in applied R&D that had helped to enhance rice, wheat and maize production, the foreign assistance agencies reasoned that similar programs could be established to develop new birth control technologies that would be useful in Third World nations.

Over the course of a few years, five new scientific organizations were created that focused on the contraceptive needs of couples in developing countries. The Special Pro-

*Among the governments were those of Denmark, Finland, Great Britain, Norway, Sweden, the United States and Canada's specialized foreign assistance agency, the International Development Research Centre (IDRC). The foundations were the Ford Foundation and The Rockefeller Foundation; the multilateral agency was the UNFPA.

Table 1. Total expenditures for research in the reproductive sciences and contraceptive development, by country of origin, 1965 and 1969–1979 (in 000s of current and constant [1970] U.S. dollars)

Country of origin*	1965	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
Current dollars												
Total	31,022	54,546	71,462	94,483	110,224	117,430	118,723	115,553	125,836	142,800	149,000	154,800
United States	25,928	41,537	55,009	71,663	79,724	82,070	79,104	73,992	82,787	97,300	104,800	111,600
Other industrialized countries	4,886	11,992	15,267	21,126	28,311	33,039	38,029	39,176	39,720	45,600	44,200	43,200
Developing countries	208	1,017	1,186	1,694	1,689	2,321	1,590	2,385	3,329			
Constant dollars												
Total	38,270	57,893	71,462	90,390	100,825	100,957	91,146	79,721	82,104	91,400	88,700	82,600
United States	32,010	44,188	55,009	68,906	73,819	71,991	62,287	53,232	56,318	62,300	62,400	59,500
Other industrialized countries	5,992	12,634	15,267	19,908	25,505	27,093	27,771	25,046	23,874	29,200	26,300	23,100
Developing countries	268	1,070	1,186	1,577	1,501	1,873	1,088	1,443	1,912			
% distribution of expenditures (based on constant U.S. dollars)												
United States	83.6	76.4	77.0	76.3	72.4	69.9	68.3	66.8	68.6	69.6	70.3	72.0
Other industrialized countries	15.7	21.8	21.3	22.0	26.1	28.1	30.5	31.4	29.1	31.4	29.7	28.0
Developing countries	0.7	1.8	1.7	1.7	1.5	2.0	1.2	1.8	2.3			
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Countries reporting 1965–1974: United States, other industrialized countries — Australia, Belgium, Canada, Denmark, Finland, France, Germany, Great Britain, Israel, Italy, the Netherlands, New Zealand, Norway and Sweden; developing countries — Africa, Egypt, Hong Kong, India, Iran, the Philippines, South Korea, Thailand and Turkey.

Countries reporting 1975–1979 — data for governments other than the United States are based on 1976 estimates (e) and reports (r). United States; other industrialized countries — Australia (r), Belgium (e), Canada (r), Denmark (r), Finland (e), France (r), Germany (r), Great Britain (r), Israel (r), Italy (r), Japan (r), the Netherlands (r), New Zealand (e), Norway (r) and Sweden (r); developing countries — Africa (e), Egypt (e), Hong Kong (e), India (r), Iran (e), Latin America (r), the Philippines (e), South Korea (r), Thailand (r) and Turkey (e).

gramme of Research, Development and Research Training in Human Reproduction of the WHO, the Population Council's International Committee for Contraception Research (ICCR), the Program for Applied Research on Fertility Regulation (PARFR), the International Fertility Research Program (IFRP) and the Program for the Introduction and Adaptation of Contraceptive Technology (PIACT).* A sixth R&D program, the Contraceptive Development Branch of the CPR, was also established during this period to develop new and improved contraceptives for the American people. All are successfully operating today.

The WHO Human Reproduction Programme, launched in 1972, has a number of components besides contraceptive R&D, including the development of scientific institutions and manpower in Third World countries, the setting of scientific and technical standards, the provision of supplies and equipment needed for research, and establishment of information about the performance of existing methods of birth planning. The Programme has established a series of task forces, each devoted to the development of a potential contraceptive lead. The task forces plan and organize mission-oriented and applied R&D directed at new birth planning technologies. Of the WHO Programme's total budget of $16 million in 1978, only $4.3 million was allocated to applied contraceptive R&D.

The ICCR program, established in 1971, focuses intensively on product development, basing most of its activities on technological leads that are at or near human trial. The ICCR is the only one of the programs that conducts extensive product formulation and development work in its own laboratories. It conceives its mission as closely analogous to the role traditionally played by pharmaceutical company research divisions in the development of new contraceptive technologies. Its annual budget for contraceptive de-

Table 2. Estimated worldwide funding for reproductive biology and contraceptive development, 1965 and 1969–1979, by sector (in millions of constant [1970] U.S. dollars)

Sector	1965	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
United States												
Total	32.0	44.2	55.1	68.9	73.9	72.1	62.4	52.9	54.7	62.3	62.4	59.6
Government	11.4	19.9	25.3	32.0	41.3	44.8	38.0	30.8	41.4	44.8	45.8	47.7
Philanthropic & nonprofit	8.2	11.1	16.8	22.6	16.9	14.2	12.7	6.2	3.8	8.5	8.3	4.4
Industry	12.4	13.2	13.0	14.3	13.7	13.3	11.7	9.9	9.5	9.0*	8.3*	7.5*
International												
Total	8.3	13.7	16.4	21.5	27.8	28.9	28.7	30.1	30.7	29.1	26.3	23.1
Governments	6.2	13.7	16.3	21.2	24.7	24.4	21.3	24.8	25.8	24.3*	22.6*	20.3*
Nonprofit	0.07	0.04	0.06	0.26	3.1	4.5	5.4	5.3	4.9	4.8	3.7	2.8

*Survey data are not available for after 1976. It is assumed that expenditures remained at 1976 levels.

*The WHO program is funded by the governments of Canada, Denmark, Finland, Great Britain, India, Mexico, Norway, Sweden, Thailand and the USFPA. The ICCR is supported by private foundations, the U.S. government and Canada's IDRC. The PARFR is funded entirely and the IFRP principally by the U.S. government. The PIACT is supported by the U.S. and British governments, the USFPA and private foundations.

velopment is approximately $2.7 million.

The IFRP, founded in 1971, concentrates on large-scale clinical trials of contraceptive technologies. It specializes in setting up national networks in developing countries for clinical trials of contraceptives in order to evaluate their performance and to promote their local introduction and use. Its overall budget is about $4.4 million, of which about $1.5 million is for contraceptive development.

The PARFR program was originally established in 1969 to provide scientific venture capital to promising ideas for potential new methods that were not funded by the two larger programs. Although the PARFR now operates a more directed grant program and is establishing its own clinical testing network, it seeks to avoid overlap with the WHO and the ICCR programs. Its annual budget for contraceptive development is about $900,000.

The PIACT, founded in 1976, is the most recently established of the five organizations. It was created to close the gap between contraceptive development and actual production, adaptation and introduction of new methods in developing countries. The PIACT generally concentrates on packaging, manufacturing, informational materials, product servicing and repair capacities and product distribution needs associated with the development of new technologies. Its annual budget is about $400,000.

These five international programs have established close working ties with the Contraceptive Development Branch of the CPR. The Branch conducts a centrally designed and coordinated contraceptive R&D program through the use of government contracts. Expenditures of the Contraceptive Development Branch in 1979 were about seven million dollars, 14 percent of the CPR's entire research budget.* Although none of the five international contraceptive development programs receive CPR support, all of them benefit substantially from its research program — especially from the leads developed from CPR-backed basic and mission-oriented research.

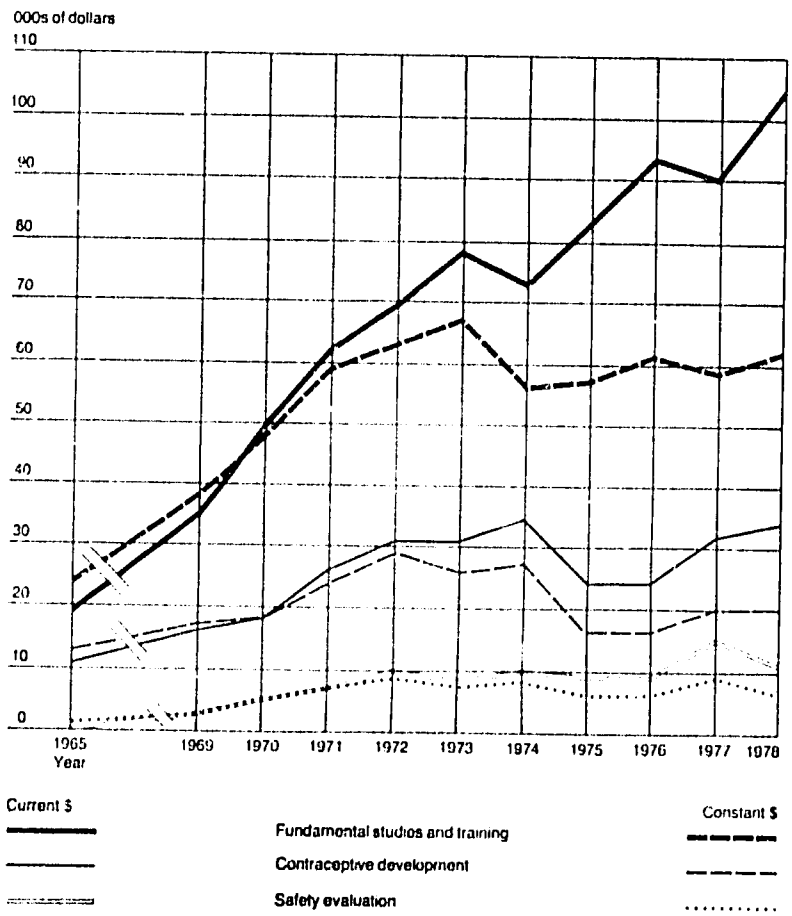
Close working ties between the R&D organizations and the pharmaceutical industry have been established, enabling the public-sector programs to draw upon industrial experience and proprietary information and to arrange for industry to manufacture and distribute new products they have developed. They have also been successful in engaging scientists and scientific institutions from developing countries to participate in R&D activities. More than two dozen new centers for laboratory and clinical research have been established in developing countries through links with these six organizations. In addition, working ties have been established with Third World national medical research insti-

Table 3. Percentage distribution of expenditures in the reproductive sciences and contraceptive development, by purpose, 1965 and 1969–1978

Purpose	1965	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Fundamental studies, training	62.0	65.0	68.0	65.4	62.6	66.6	61.8	71.8*	73.6*	68.0	70.1
Contraceptive development	35.3	30.0	24.7	27.1	28.3	26.2	29.5	20.5	19.4	22.0	22.8
Safety	2.7	5.0	7.3	7.5	9.1	7.2	6.7	7.7	6.8	10.0	7.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Includes unclassified expenditures.

Figure 2. Worldwide expenditures for fundamental reproductive studies and training of scientists, contraceptive development and evaluation of contraceptive safety, 1965–1978 (in 000s of current and constant [1970] U.S. dollars)



*The CPR is by far the world's largest funder of basic and mission-oriented reproductive research through its grants program. It also carries out evaluation research on the safety and performance of existing contraceptives, provides scientific training and institutional support and conducts a small intramural research program of its own as well.

tutions, such as the Indian Council for Medical Research.

Current Areas of Effort And Funding Levels

The six R&D organizations are currently working on more than two dozen potential new contraceptive methods. As Table 4 indicates, the current allocation of resources for contraceptive development by the public-sector institutions. More than 70 percent of research expenditures are directed to new contraceptive methods for women, only six percent are devoted to finding new male methods. (The remainder go to research into methods that might be applicable to either sex or both sexes, such as releasing factors or periodic abstinence.) In recent years, considerable effort has been made to find a male method. The current concentration on female methods is not a reflection of a male chauvinist bias among researchers, but is the result of the fact that there are more potential possibilities for developing female than male methods and that more is known about the female than the male reproductive system.

Thirty-seven percent of the public-sector investment in contraceptive development is going to new approaches to steroidal contraception for women: subdermal implants, improved orals, injectables, vaginal rings and intranasal sprays. Ten percent is going for various approaches to an antipregnancy vaccine. Eight percent is being devoted to various experimental antifertility and antiimplantation agents, seven percent is devoted to intracervical devices and improved IUDs. Five percent is being spent on menses-inducing and abortifacient drugs. New approaches to barrier methods and to female sterilization are each receiving about two percent of public-sector funding.

About five percent of development expenditures are being devoted to research on releasing factors, which have potential for suppressing ovulation in the female (and, possibly, inducing menses also) as well as blocking the generation of sperm in the male. About six percent of public-sector funds are going for other male contraceptive drugs. About four percent are being devoted to research into various plants that might be useful as abortifacients or antiimplantation agents.

The heavy emphasis in current research expenditures on female steroidal approaches partly reflects the low-risk, quick-return decisions dictated by the relatively small (and shrinking) share of research dollars accorded to contraceptive development. Since these approaches involve finding new combinations and methods of delivery for agents that are already well-known and tested, they seem to donors and programs to offer the most promise of delivering marketable contraceptives at reasonable cost within a fairly short period of time. In addition, the proportionately large current investment in these approaches reflects the fact that most of them are now in advanced clinical trials — the most expensive segment of contraceptive research — and some can be expected to be available for widespread use in the next three years.

There is no question that these methods will offer some advantages over those currently available, and can be expected to increase the ability of couples in the developing world to exercise control over their fertility. These improvements, however, do not appear to offer the kind of radical advances in birth control technology that many had hoped for, and which the current scientific base seems capable of providing.

In the following section, we discuss the prospects for the development of five potential methods, any one of which, the authors believe, would significantly increase current use; combined, the methods could revolutionize current contraceptive practice in developing as well as in developed countries. These are a nonsurgical means of female sterilization, a reversible method for men, an antipregnancy vaccine for women, a self-administered menses inducer and a postpartum IUD. While all of these potential methods are currently under investigation by public-sector contraceptive development programs, together they account for less than one-third of public-sector investment in new method development, and not one of them accounts by itself for more than 10 percent of public-sector research efforts.

The profiles of the five potential methods are presented not only to assess the prospects for their development, the problems associated with their use and their potential utility in worldwide family planning programs, but also to shed light on what needs to be done to make applied contraceptive R&D more effective and efficient.

Table 4. Percentage distribution of public-sector expenditures for development of new contraceptive methods, 1978

Type of method	%
All female methods	**71.2**
Steroidal	37.2
Subdermal implants	(16.9)
Improved oral contraceptives	(9.9)
Injectables	(5.4)
Vaginal rings	(4.4)
Intranasal sprays	(0.5)
Vaccines against pregnancy*	10.1
Sterilization	2.0
Reversible	(0.4)
Nonsurgical	(1.6)
Antifertility and antiimplantation agents	8.3
Intracervical (ICD) and intrauterine (IUD) devices	6.9
ICDs	(1.6)
Postpartum IUDs	(1.6)
Other IUDs	(3.7)
Menses-inducing and abortifacient drugs	4.5
Barrier methods	2.2
All male methods	**6.1**
Systemic	5.5
Reversible sterilization and improved vasectomy techniques	0.6
Methods for couples and unclassified	**22.7**
Releasing factors*	5.1
Plant agents	3.9
Periodic abstinence	4.8
Other and unclassified	8.9
Total	100.0

*The percentage of total expenditures for releasing factors, derived from 1978 data, is almost certainly higher because of increased interest in this line of research, while the proportion devoted to steroidal male methods and to antipregnancy vaccines has probably decreased because of problems encountered with research on these methods.

Five New Methods:

I. Nonsurgical Female Sterilization

Description. Current efforts to develop a nonsurgical method of female tubal sterilization involve the delivery of a sclerosing agent to the uterotubal opening via the vaginal cervix and uterus. By irritating the tissue of the fallopian tube, the substance causes the lumen of the tube to close from scarring. Ideally, the method could be delivered by paramedical personnel trained to insert IUDs, and delivery could be accomplished without pain, using local anesthesia. Effectiveness should be as high as that experienced with current methods of surgical sterilization. These methods would need to be nontoxic. Sterilization would be irreversible.

Status of research. Two substances and various means of delivery are now under investigation. Methylcyanoacrylate and quinicrine hydrochloride are now being used in clinical trials. The former is a widely used "tissue glue" that polymerizes in the tube, forming a plug to which the tissue adheres. The plug eventually biodegrades, leaving behind scar tissue which permanently closes the tube. A specially designed instrument which does not require visualization of the tubal openings is used to place the methylcyanoacrylate inside the fallopian tube.

Quinicrine is a drug that has been used for treatment of malaria. When placed in the uterine cavity in the form of crystalline pellets or in a thick suspension, the chemical enters the oviducts, initiating a scarring process that results in tubal closure. A potentially more effective way of introducing the quinicrine into the tubal opening, by attaching pellets of the drug to the transverse arms

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or fundal portion of an IUD, is being tested. In this procedure, the pellets are held in place for several days, providing a longer time for the drug to penetrate the tubes. If complete tubal closure is not accomplished, the IUD is still in place to provide protection until a second application can be made.

Both of these sclerosing agents, and several instillation procedures, are being tested in small clinical trials to determine the effectiveness of tubal closure and to evaluate levels of safety and freedom from side effects. Long-term follow-up of subjects is necessary to observe the effective duration of closure as well as such possible problems as increased risk of ectopic pregnancy. At present, the methylcyanoacrylate seems to be only 80 percent effective in completely closing the tubes on just one application. It is believed that with two applications, an effectiveness rate of 95 percent could be achieved. Efforts are being made to improve delivery. Modifications of the instrument used for instillation are being investigated that would reduce its cost and improve its performance.

Researchers are currently making three instillations of quinicrine pellets at monthly intervals to get a closure rate more satisfactory than the 90-95 percent rate heretofore obtainable. It is hoped that by using the IUD as a carrier, only a one-time application will be necessary.

Because of the need for long-term follow-up, the clinical trials, even though small, are costly and time-consuming. Toxicology tests for both the quinicrine and methylcyanocrylate applications will be required. To achieve better than a 95 percent effectiveness rate for any of these methods, it is probable that prolonged clinical testing will be needed to obtain the optimal combination of instillations, time between instillations, drug carriers and instrumentation, especially if the technique is to be used by paramedical personnel.

Research into other potential chemical sterilants, possibly in conjunction with tube-relaxing drugs, is being considered by investigators, but as yet has not obtained funding. It is likely that it will be several years before these experimental techniques are sufficiently advanced to merit wide scale field trials. There will need, in turn, to be several years of field trials to ascertain effectiveness, safety and acceptability. Thus, it is likely to be as much as 10 years before a highly effective chemical sterilant is generally available.

Advantages. A nonsurgical method would involve far less pain and discomfort than do sterilization methods now in use. The user would not require hospitalization nor the unavoidable long recovery period necessary with surgical methods. The risk of morbidity and mortality associated with general anesthesia (used with some current methods) and opening the abdomen to reach the fallopian tubes should be eliminated. Although risks with current methods such as minilaparotomy and laparoscopic sterilization are already quite low in developed countries, they tend to be somewhat higher in developing countries, especially if the sterilization is performed outside a hospital. The cost of nonsurgical sterilization should be lower than that of minilap, and much lower than that of laparoscopic sterilization.

A major advantage of the method is the possibility that it could be delivered by paramedical personnel, which would make it possible to meet the increasing demand for sterilization from women in areas where there are few surgical facilities. Presumably, the sclerosing methods, at any rate, could be utilized in any setting where IUDs can be inserted.

Scientists seek a way to chemically seal tubes (above, microphoto, hamster oviduct surface).

Drawbacks. It is possible that none of the agents currently under investigation will be capable of yielding effectiveness rates as high as those of surgical techniques because of incomplete closure or recanalization of the damaged section of the tube. This could mean that up to five percent of women who undergo the procedure would get pregnant. Incomplete closure could increase the risk of ectopic pregnancy — but since this is a life-threatening event, the method certainly would not be introduced if it involved a substantial risk. Concern about this problem, however, will add to the research required before such a method can be made widely available. In addition, there may be rare complications associated with the chemicals used. (For example, quinicrine hydrochloride has been observed to cause adverse reactions in the central nervous system if it gets into the general circulation in large amounts.) Even the simplest approaches currently under study require operators with a fairly high level of technical skill and will probably require a clinic setting where sterile instruments are available. Ideally, only a one-time application of the sterilant would be required. However, it is currently necessary to perform the procedure twice with at least a one-month interval to ensure tubal closure. In the meanwhile, an alternative method of contraception has to be used.

Organizations involved. Currently, the CPR, the WHO, the IFRP and the PARFR are the major agencies supporting this type of research.

Current funding. As of 1978, roughly two percent of public-sector funds for applied

contraceptive R&D were being spent on these methods—or somewhat less than $300,000 annually. About half of the funds went to the IFRP's research with quinacrine, and the other half to research on methylcyanoacrylate conducted by the PARFR and the WHO.

Future requirements. Current funding is inadequate to finance a comprehensive effort to exploit the technological opportunities associated with nonsurgical approaches. Just to bring current investigations through the initial clinical trials will require a minimum of $2–3 million over the next five years. It would require an investment of some $750,000 annually over about 10 years to cover the costs of clinical studies, formulation development, and toxicology studies for an effort that pursues multiple approaches simultaneously (for example, studies of a variety of types of pellets and different kinds of IUD carriers), as well as a search for other types of sterilants and for drugs to facilitate their entrance into the fallopian tubes. Such a comprehensive effort is probably needed to develop a method with an efficacy rate of over 98 percent with just a single administration.

Institutional constraints. Only a small number of researchers are working to develop a nonsurgical sterilant. Although they have been extremely productive and creative, their efforts would benefit from a more broadly based institutional approach. The CPR has limited its interest in this method to the funding of a few projects, possibly because nonsurgical sterilization is considered to have its major usefulness in developing countries where laparoscopic sterilization is unavailable. The WHO has also pursued this approach with only a small-scale effort. No institution, including those sponsoring this approach, has invested in studies to determine whether a nonsurgical sterilant would be acceptable to potential users, programs and medical authorities in developing countries if no better than a 95 percent effectiveness rate can be attained, and if more than a single application of the sterilant is necessary. There is also an ethical limitation on the clinical testing of potential new sterilants in countries where minilap and laparoscopy are available, in light of the fact that the experimental methods are likely to be less effective than the proven ones.

II. A Reversible Method for Men

Description. There are three approaches to male contraception: stopping the production of sperm, blocking the transport of sperm during intercourse, and affecting the quality of sperm so that they are incapable of fertilization. All male methods currently in use — vasectomy, the condom and withdrawal — are based on the second approach. What is being sought by contraceptive R&D organizations is a highly effective, reversible, self-administered, coitus-independent contraceptive that does not interfere with libido, is free from dangerous side effects, is inexpensive and is easy to distribute.

Status of research. It has long been known that massive doses of steroids will usually cause infertility in men by shutting down sperm production. Until recently, investigations into a possible male method have concentrated on different combinations of various steroidal hormones.

"By now, it is generally recognized that there can never be . . . an ideal contraceptive, and that an array of methods is needed . . . ."

Another promising method for arresting spermatogenesis has recently entered early clinical trials: a chemical analog of the brain hormone luteinizing hormone-releasing hormone (LHRH). The effects of this decapeptide, which stops sperm production in male rats, is being carefully observed in a small group of volunteer men. (The same chemical is being tested as an ovulation inhibitor in women.) The LHRH analogs now being tested must be administered by nasal spray or injection, however, it is believed that if an analog proves successful in inhibiting spermatogenesis in men, a more convenient form of administration will be developed (for example, a daily pill or a yearly subdermal implant).

There has probably not been sufficient basic research to understand the effects of LHRH on the reproductive processes. Thus, synthesis of better analogs and new dosage formulations will have to be developed simultaneously. If the analogs now in limited clinical trial prove successful, it will still be at least seven years and, if new analogs are needed, possibly 10–15 years, before they become generally available.

Another method under investigation that is apparently highly effective in stopping sperm production is gossypol, a derivative of cottonseed oil. Chinese scientists claim to have administered gossypol pills for at least six months to some 4,000 men, with an efficacy rate of 99 percent. Some of the men have been on the pills for more than six years. The pills are taken daily for about two months until sperm are no longer observed, and then are taken weekly to maintain infertility. Fertility generally returns to normal in about three months after discontinuation of treatment. Gossypol apparently works by incapacitating the sperm-producing cells.

Several research organizations outside China are investigating possible long-term adverse side effects of gossypol through animal studies, and more clinical information is being sought from China. At least three to five years will be required for widespread human testing in other countries after current toxicology studies are completed. If side effects prove to be significant, a gossypol analog synthesis and screening program will be required to discover safe but effective compounds, and it would be 10–15 years before a marketable product would be generally available.

Little progress has been reported in finding an acceptable method which would cause infertility by inhibiting sperm maturation or motility. Chlorinated sugars were found to arrest the maturation of sperm in marmosets, but discovery that they were toxic to the marmosets' central nervous systems caused the WHO to abandon this line of research.

Important mission-oriented research remains to be done on sperm maturation and capacitation in order to make this type of research truly productive.

Some scientists are also intrigued with the potential of inhibin as a male contraceptive. If this naturally-occurring substance could be structurally identified and synthesized, it is thought, it could be effective in suppressing the secretion of follicle-stimulating hormone (FSH), necessary for normal spermatogenesis. However, considerable mission-oriented research would have to be undertaken before inhibin could be considered a potential male contraceptive. Not only does inhibin itself have yet to be isolated in its pure state, but evidence needs to be accumulated that it can inhibit the secretion of FSH in a mature male.

Advantages. All of the methods under investigation have an advantage over current reversible male methods in that they are not associated with sexual intercourse. If they can be self-administered, men will be able to share contraceptive responsibility with their partners.

Based on clinical experience to date, it is thought that the LHRH analogs will have few systemic side effects.

In addition to being effective as a contraceptive, gossypol should have little or no effect on libido, since it does not seem to affect the cells producing the male sex hormone, testosterone. The raw material is widely available, and the product should be relatively inexpensive. Neither LHRH nor gossypol would require clinical or surgical

facilities, and both should be relatively easy to distribute.

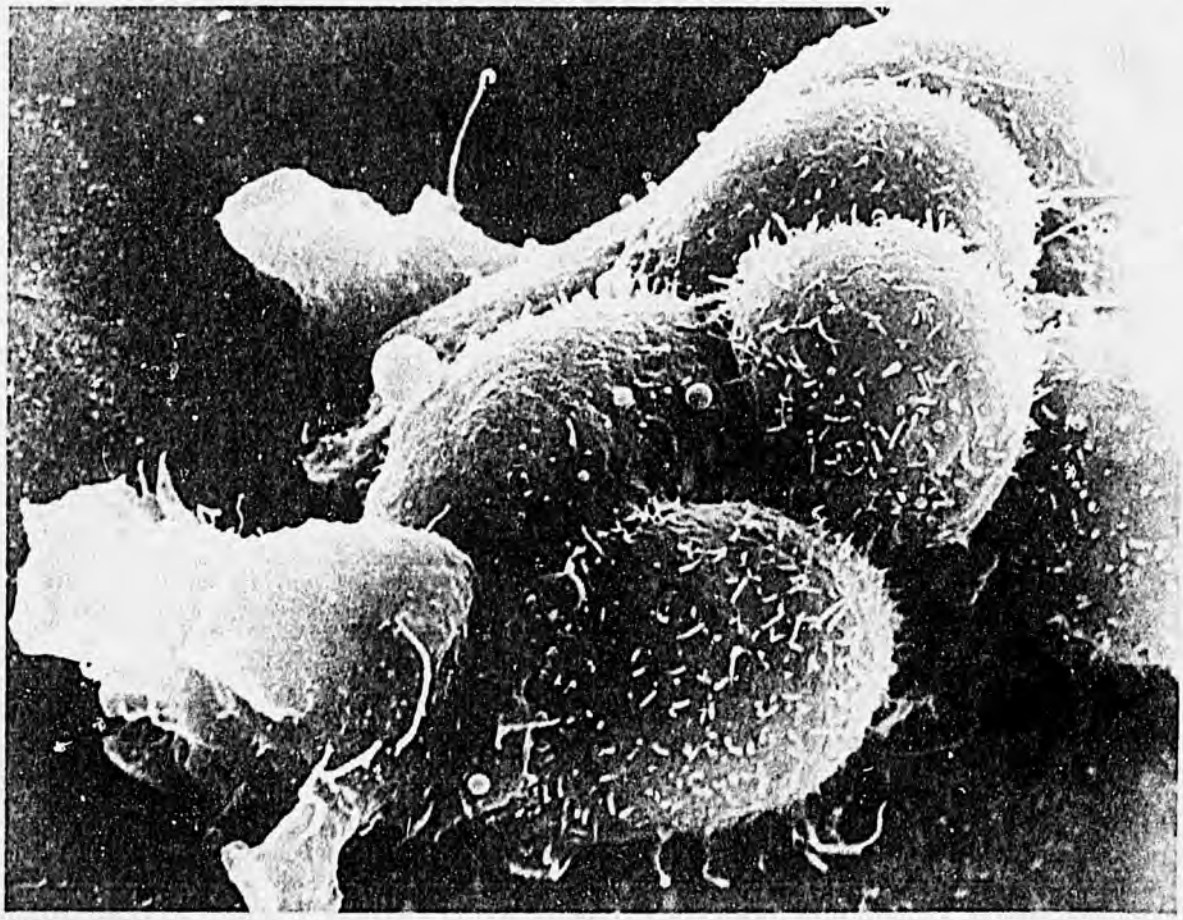
Drawbacks. In addition to their contraceptive effect, the steroids also reduce testosterone synthesis, sometimes resulting in loss of libido and development of female secondary sexual characteristics (such as enlarged breasts). Studies undertaken over the past 10 years, using several types of steroids and regimens, including or omitting testosterone to protect against feminizing side effects, have shown not only that exceedingly large steroid doses are required, but also that the method is of unreliable effectiveness. That is, sperm counts are not reduced to zero in all men. In addition, testosterone has to be administered by injection at fairly frequent intervals, requiring clinical facilities, and recovery of fertility takes up to six months in some subjects.

LHRH analogs may decrease the synthesis of testosterone (and therefore libido); thus, testosterone supplementation may be required. Both LHRH and gossypol would probably require one to two months of daily administration before they completely suppress sperm production. Therefore, another method of birth control would have to be used until a zero sperm count was achieved. Similarly, another method of birth control would need to be used during the approximately three months required for return of normal sperm counts and sperm quality.

At present, the reversibility of the effects of these drugs on the testes is not well understood. Obviously, if there is permanent damage to the sperm-producing cells, neither product would be approved as a contraceptive. At any rate, it is likely that a very long recovery period would be required for any method that blocked sperm production. To demonstrate reversibility will require extensive long-term clinical studies, contributing to the relatively long period that will be needed to make such methods generally available. Gossypol may well have some adverse side effect in humans since it is known to be highly toxic in some animal species. Its effects on organ systems (other than the reproductive organs) may depend on diet or general health, and evidence of low serum potassium levels in some of the Chinese subjects requires further investigation.

While in some cultural settings, a male pill may prove very popular, it may not be acceptable in others.

Organizations involved. LHRH agonists are being explored as a male method by the CPR as well as the ICCR. At least five pharmaceutical companies have begun fairly substantial programs involving LHRH analogs as potential contraceptive agents; however, the total size of these programs, and the amount devoted to male methods, is unknown. Outside of China, animal research with gossypol is being undertaken under the auspices of the ICCR. The WHO is considering work on gossypol and conducted a modest research program to investigate inhibin as a potential contraceptive. It also supported work on steroids (as did the ICCR) and on chlorinated sugars until the recent discovery that they



Ideally, male contraceptive methods should not interfere with testosterone production (above, electron micrograph of testosterone-producing cells in culture).

were toxic. However, the WHO has indicated that because of lack of funding, it will disband its task force on male contraception unless there is some major progress reported on gossypol research from China.

Current funding. In 1978, about six percent of funding for contraceptive development went into research on male systemic methods. Since that time, however, work in steroidal approaches, which accounted for most of the expenditures, has been largely discontinued, and the WHO program may be entirely abandoned. The CPR has awarded one $300,000 contract for the study of LHRH in males and is currently negotiating another contract of similar size. The ICCR is spending an estimated $168,000 in 1980 for gossypol and LHRH research. As we have noted, five pharmaceutical companies are also involved with LHRH analogs, but the amount of expenditures is unknown.

Future requirements. If donors are seriously interested in developing a male contraceptive within the next decade, they must be prepared to embark on a major mission-oriented research program that will involve very large expenditures for toxicology studies on current analogs and, if these are shown to be safe, subsequent clinical trials. At least $15 million will be needed for development of a male contraceptive based on an LHRH analog. If inhibin is to be followed up as a possible contraceptive, at least $3 million will be needed over the next two to three years to isolate and collect the protein, and another $10–20 million over 10–15 years before a product could become generally available. More precise cost and time estimates are impossible to make at present. Donors should encourage R&D programs to develop comprehensive plans and cost estimates for developing male methods by indicating their real interest in providing long-term funding for mission-oriented research.

Institutional constraints. All public-sector agencies have expressed interest in development of a systemic male contraceptive. At present, there is considerable support by the U.S. government for the LHRH-analog approach, and much of the toxicological and dosage formulation research may be undertaken by the pharmaceutical companies which are keenly interested in these peptides for ovulation induction and suppression.

A major constraint has been the inadequacy of understanding about the male reproductive process. As a result, much of the current work had to proceed, at least partially, in the blind. Another major institutional constraint has been the lack of commitment to long-term pursuit of leads that may require five to 10 years of intensive R&D before they can yield marketable products.

When the only potential male method involved steroid research, all of the R&D programs, under pressure to come up with a male method, picked up on one or another steroid approach. Because there was insufficient data-sharing and research collaboration, some of these efforts tended to be duplicative rather than mutually reinforcing. It is to be hoped that current research involving LHRH analogs, gossypol and other approaches will not repeat that mistake.

III. An Antipregnancy Vaccine

Description. Contraception would be achieved by vaccination with protein antigens specific to pregnancy or to an organ involved in the reproductive process. Circulating antibodies would interfere with ovulation, corpus luteum function, fertilization, early implantation or maintenance of pregnancy, depending on the antigen selected. Ideally, the method would be administered in one injection. After a period of months required for the antibody titers to build up to sufficient levels, contraceptive effectiveness would be maintained for one to three years. Such an immunological method should be reversible with declining antibody titers, but effective contraception could be renewed by means of a single booster vaccination administered in the final months of the effective period.

Status of research. The principle of antibody reaction in response to an injection of a protein derived from the beta chain of human chorionic gonadotropin (hCG) has been shown in human clinical trials. However, the effectiveness of the antibodies and the safety of the method have not yet been demonstrated.

Two major approaches have been utilized. The first involved immunizations with an antigen consisting of highly purified beta-hCG chemically linked with tetanus toxoid. Menstruation and ovulation continued normally, but some pregnancies ensued. A more active antigen appears to be needed.

Theoretically, one problem with this approach is the possibility that cross-reactive antibodies could neutralize other similar pituitary hormones, stopping the function of the target organ permanently, inducing autoimmune tissue injury to the pituitary gland or forming circulating immune complexes that could result in kidney damage.

Although no such cross-reactivity was found in experiments with women, some researchers have sought to protect against this possible problem; their work has constituted the second major approach to an antipregnancy vaccine. Those researchers have concentrated on finding a vaccine against a unique fragment of the beta-hCG chain which does not cross-react. However, the difficulty of finding a powerful enough adjuvant to create an effective antibody reaction is even greater when dealing with such a small fragment than when the whole beta-hCG molecule is the target.

Investigation at a much more basic level is also proceeding on antigens derived from the zona pellucida, the outer coating of the ovum at the time of ovulation and before implantation. Such antibodies are thought to form a deposit on the outer surface of the zona, which prevents sperm penetration and thus inhibits fertilization. Such antigens have not yet been isolated in pure form, and it is unlikely that an effective human vaccine could be made available in the near future.

Sperm antigens are also being studied, but so far they have proved relatively ineffective in animal tests. Research in this area is therefore at a basic level.

Given the very early stage of R&D in this area, a minimum of 10–15 years of sustained, high-priority effort will be needed to produce a vaccine using either the beta-hCG or one of the other approaches.

Advantages. Vaccination is a universally appreciated and understood medical intervention. The method is unlikely to require any special facilities for delivery, since in most countries there are already facilities for vaccination programs, and paramedical personnel and barefoot doctors are already trained to give injections. Effectiveness should be high, and the antifertility effect would be limited to one event in the reproductive process. Thus, short-term side effects should be minimal, and regular menstrual cycles should be maintained. Women would have no problems of storage, disposal or genital manipulation. The eventual cost would probably be similar to that for other types of vaccinations offered by public-health programs in developing countries.

Drawbacks. Long intervals of effectiveness imply a relatively long time period for return to fertility, which might in itself reduce acceptability among some women. During the initial period — about three months — when antibody titers were being built up, and in the final months of declining titers, another method of contraception would be needed. Although paramedical personnel could administer the injections, they would have to be specially trained to deal with allergic reactions inevitable among a small percentage of recipients. What is more, a vaccination program requiring periodic inoculations is known to be difficult to mount and maintain in some developing-country settings. Use of family planning outlets could make this problem more manageable. While there are likely

to be few or no direct side effects, there would be medical concerns about long-term health hazards with this as with any other immunization procedure. Acceptability may also be reduced if women confuse this long-acting method with sterilization.

Organizations involved. The ICCR, the WHO, the CPR and the PARFR have all been involved in one or another aspect of vaccine research. The WHO was one of the major agencies involved in beta-hCG vaccine research and in zona pellucida and sperm antigen approaches, the ICCR is continuing its beta-hCG research, the CPR is funding work on zona pellucida approaches, and the PARFR is working on sperm antigens. At least two pharmaceutical companies are also believed to be active in investigations into a vaccine.

Current funding. About 10 percent of public-sector funding for applied R&D was being expended annually by the public sector on all of these approaches as of 1978. The largest share, about $1.2 million, was going into beta-hCG research. Private sector involvement is believed to be small.

Not a single new contraceptive chemical entity has reached the market since . . . the synthetic steroid norgestrel in 1968.

Future requirements. At this early stage of development, concentration on any single approach would involve a very high risk that no usable vaccine will result. A broad-scale effort, involving research into a variety of antigens and approaches, is required. Such a mission-oriented approach would involve costs on the order of $3-6 million per year over at least 10 years, but would appear to offer an excellent probability of producing an effective vaccine.

Institutional constraints. In the past, donors and programs have taken a short-term approach, and have concentrated mainly on beta-hCG rather than making a long-term commitment to a large, multiapproach, sustained effort. When initial efforts did not result in an immediate payoff, enthusiasm cooled. Because of budget cutbacks, the WHO may disband its entire immunological task force, and the ICCR may be forced to decrease its activities involving the beta-hCG approach because of the high cost of adjuvant development. Unless there is a commitment to a sustained, multiapproach effort, backed by sufficient funds, it is unlikely that a usable product will result.

Such an expanded R&D program would require strengthening of connections between immunologists and reproductive biologists, and application of their combined expertise to the perplexing problems involved in vaccine research, working closely with the R&D programs that thus far have had relatively little experience in this area. Greater participation by the CPR would be highly desirable because of its capacity to fund the relevant basic and mission-oriented research needed. To date, the CPR has not been very active in this field, perhaps because of a perception that a vaccine is essentially a method for developing countries, while its mission is to address the health problems of Americans.

IV. A Self-Administered Menses Inducer

Description. Scientists have long been interested in developing a pill, liquid, nasal spray or vaginal tampon that could be self-administered at the expected time of menses (or shortly thereafter) to induce menstruation and evacuation of the uterus. A desirable agent would have few side effects and would totally evacuate the uterus. It should be readily available through commercial sources as well as family planning programs.

Status of research. Several approaches are currently under investigation. The most advanced work is with prostaglandin analogs. These induce uterine contractions, thus terminating pregnancy during the first eight weeks (and during the second trimester) of pregnancy. No such product has yet been developed which can be taken orally without unacceptable gastrointestinal effects, but with additional research and development efforts, some prostaglandin analogs may be found suitable, although the costs, at least initially, may be high. By the nature of their action, all prostaglandins will probably cause some gastrointestinal tract stimulation; however, such reactions have been reduced greatly, and can probably be reduced even further without diminishing uterine action. Compounds now available in the form of vaginal tampons or injections appear to be at least 90 percent effective in completely evacuating the uterus when administered during the first eight weeks of pregnancy. Current products have already gone through final testing in several countries, and will soon be available for widespread use. (In the United States, clinical trials are still in progress and general availability may still be some two to three years away.) Analogs with greater efficacy and reduced side effects may not be available anywhere for another three to five years.

In some animal species, prostaglandins have been shown to stop progesterone production by the corpus luteum — a process called luteolysis. However, no prostaglandin analog has yet been proven to be luteolytic in humans. New prostaglandins are now being tested for the characteristic in nonhuman primates. One to two years of monkey trials will be needed, and, if successful, will have to be followed by toxicology and clinical trials. LHRH analogs also appear to be able to decrease progesterone production and have terminated pregnancies in rats. However, analogs currently under study have not proved powerful enough to terminate progesterone production by the corpus luteum in human subjects once pregnancy has occurred. Some basic R&D work is under way to isolate agents from medicinal plants such as the *Montana tomantose* (zoapatle) that are known to have abortifacient effects.

At least five to 10 years will be needed for development of a luteolytic prostaglandin, a luteolytic LHRH analog or a medicinal plant agent.

There are a number of other biological approaches that could be pursued in an all-out mission-oriented approach. Among these are chemicals which are toxic to specific placental or embryonic cells; chemicals that alter the blood supply or hormone production of the corpus luteum; and chemicals that bind to hormone receptors. Little applied R&D is yet going on in any of these areas, largely because it is not likely that a usable product could be developed within a decade. Yet, if efforts to find a suitable prostaglandin or LHRH analog or plant extract fail, and if other approaches are not pursued, further development of a method about whose usefulness there is wide agreement among scientists and family planning program professionals could be delayed.

Advantages. If a self-administered method was relatively inexpensive and did not require an extensive medical infrastructure (except when rare problems such as incomplete evacuation of the uterus occurred), it would have wide acceptability in many developed and developing countries. It would need to be administered no more than once each month or, if use was restricted to those times when menses is delayed, only three or four times a year. Depending on its mode of action, the method probably would not cause irregular bleeding — in fact, if taken monthly, some of the agents would serve to regularize the menstrual cycle. In addition, the method would be similar in its form of administration to folk medicines (such as herb teas) that are widely used by women in many developing areas, but would not provoke the disastrous consequences attendant upon ingestion of some of those substances.

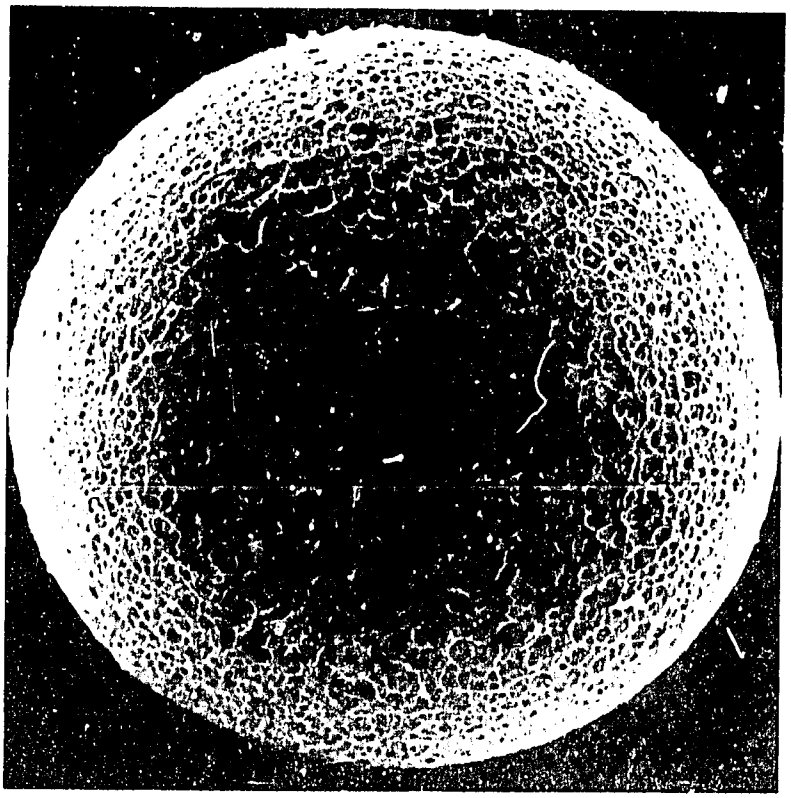
Drawbacks. Side effects currently associated with available prostaglandins include nausea

and diarrhea. However, administration of the prostaglandins in conjunction with antiemetics and other drugs has helped to control these side effects. In addition, uterine evacuation is not complete in all cases, requiring medical backup to complete the abortion. In countries where abortion is illegal, it is doubtful that this product would be acceptable. If a uterotonic analog (that is, one that causes uterine contractions) could be developed that did not affect other organs (such as the smooth muscle of the intestinal tract), it would be quite useful because of the advantage of self-administration.

A method that would stop the production of progesterone by the corpus luteum (which is necessary to prepare the uterus for implantation of the fertilized egg and to maintain a pregnancy during the first few weeks) would have none of the side effects common with uterotonic preparations; evacuation of the uterus should be complete; and, since the product would be administered at the time of expected menstruation, without determination of pregnancy, it might be acceptable even in countries where abortion is not legal. However, couples morally opposed to abortion might still find such a method unacceptable because of the possibility that they were terminating an established pregnancy rather than preventing a conception. In addition, considerable educational efforts would be needed to discourage women from using such a method too late after the time of their expected period (since the corpus luteum is needed to sustain pregnancy for only a few weeks after implantation).

Organizations involved. The CPR has a broad-based R&D program to develop new LHRH analogs for use in ovulation suppression; and some of this work could indirectly benefit research on menses-inducing agents. The WHO is providing the major public-sector funding of testing of uterotonic prostaglandin tampons and injectable products. The AID is also funding some prostaglandin research. Both the WHO and the CPR are funding research to isolate plant products, and some of these may be useful in the eventual development of menses inducers or early abortifacients. The ICCR is investigating the luteolytic activity of LHRH analogs.

Current funding. Total annual funding by public-sector agencies for research into development of a menses inducer is about 12 percent of total public-sector expenditures for contraceptive research. Roughly half of this is going to prostaglandin research, with the rest divided between plant research and research into LHRH analogs. It is not known to what extent industry is investing in such products, although it has played a considerable role in prostaglandin research and is interested in LHRH analogs for ovulation inhibition.



Research is starting on zona-pellucida-derived antigens for a pregnancy vaccine (above, hamster zona).

Future funding needs. To complete the development of uterotonic prostaglandin analogs with diminished side effects and greater efficacy will probably take another three to five years and cost a total of $5 million in public-sector funds. A luteolytic prostaglandin, if it can be identified, probably could not be developed in less than eight to 10 years, and total cost is likely to be well in excess of $10 million. The cost of developing a suitable LHRH analog is likely to be similar, or greater (again, with some uncertainty about the outcome).

Costs of developing other products and uncertainties about success would be similar or greater, and the development time is likely to be 10–20 years, in areas where considerable mission-oriented research is needed. It should be emphasized that all of these projections are highly speculative; R&D in this area involves high risk but has potential high payoff. The more avenues that are explored simultaneously, the greater the likelihood of a successful outcome.

Institutional constraints. The CPR is constrained by legislation from developing new abortifacients. It does, however, contribute indirectly to such work through its general funding of prostaglandin and LHRH receptor research, as well as basic research on the corpus luteum and the implantation process. The WHO, the major organization supporting R&D in prostaglandins and plant substances, is slowed because of its growing focus on building up research capacities in developing countries. In general, the WHO, the PARFR, the ICCR and the IFRP have tended to shy away from large investments in avenues of research if they cannot promise donors that human testing and new products are likely to result in a relatively short period of time. Yet a vigorous and comprehensive R&D effort in this area would necessarily entail both mission-oriented research and a major screening program of new chemical agents. Only the CPR currently has the capacity for such screening and for extensive mission-oriented research. However, as noted, it is constrained by legislation from actively pursuing research into abortifacients. The other R&D programs do not have sufficient funds to pursue such comprehensive efforts. Either (like the IFRP and the PARFR) they do no work in this area, or (like the WHO and the ICCR) they do so in such a limited, piecemeal way that they are unlikely

to develop a new menses-inducing agent (other than uterotonic prostaglandins) without many years of effort and a substantial amount of scientific good fortune.

V. A Postpartum IUD

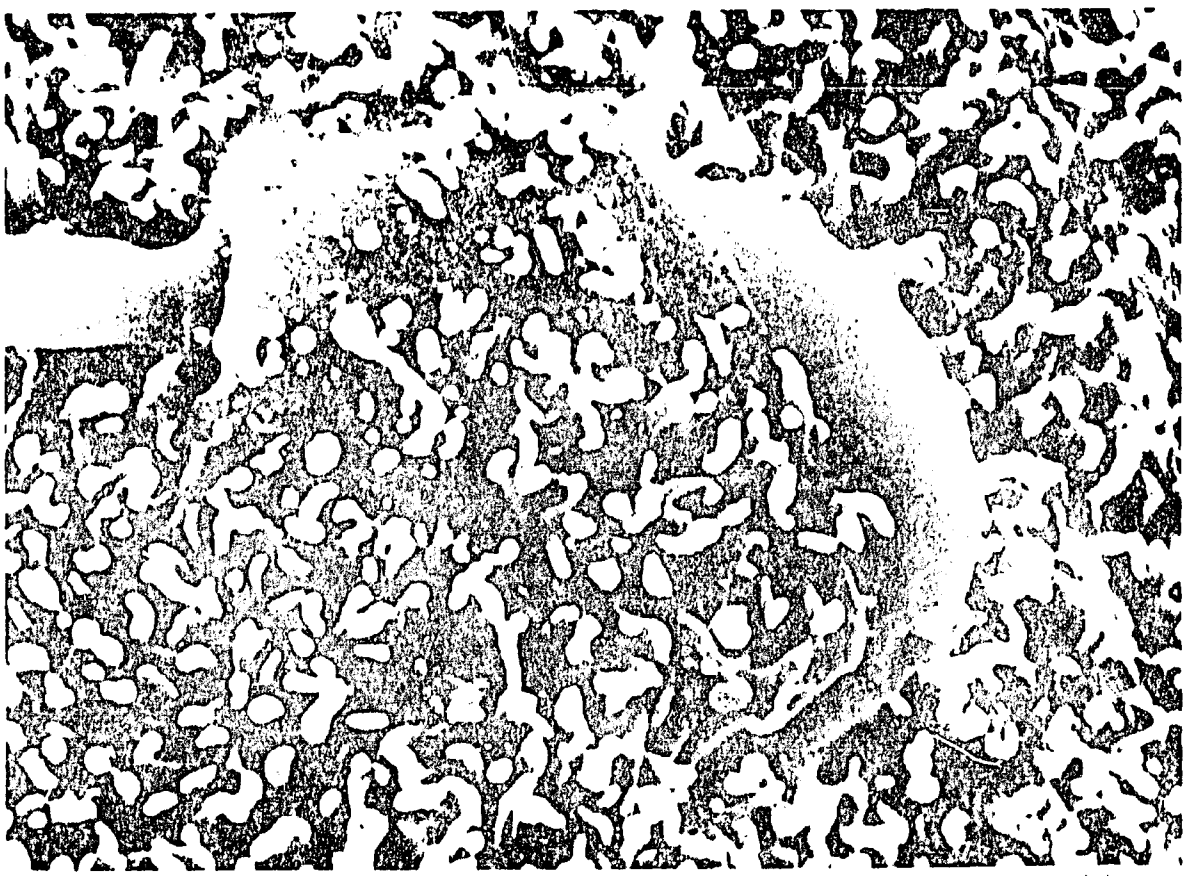
Description. An intrauterine device that would be retained when it is inserted immediately after the placenta is delivered could reach all women who have assisted deliveries. Conventional IUDs inserted during the postpartum period are likely to be expelled about three times more often than when they are inserted during the menstrual cycle. The high rate of expulsion occurs because the postpartum uterus is in the process of contracting to its prepregnancy size. Unless the IUD can be anchored high in the uterine fundus, uterine contractions can easily displace it.

Ideally, such a device would be effective over a woman's entire reproductive lifespan, and would need certainly to be effective without replacement for several years. Insertion by a specially trained nonphysician birth attendant should be feasible. At least a 98–99 percent effectiveness rate should be obtained.

Status of research. Several types of postpartum devices are currently being investigated. One is simply a Lippes loop with three surgical sutures attached to the uppermost curve. The sutures anchor into the fundus of the uterus and slowly dissolve, so that by the time uterine involution is complete, the sutures have disappeared, and a conventional IUD remains in place. A second device, a modification of the Nova-T, a copper-bearing device, has plastic flanges near the base of the stem. If placed high in the fundus of the uterus, the flanges brace against the walls of the involuting uterus, preventing downward displacement. The first device has achieved encouragingly low expulsion rates in limited clinical trials, and it is planned to expand these clinical studies quite rapidly. Since the IUD and suture materials are already approved for clinical use, toxicology requirements are minimal. Field trials to determine effectiveness of both devices will be initiated shortly. If efforts to develop inserters, informational materials and packaging are accelerated, and if training programs could be set up in use of the method, a postpartum device could become widely available in less than five years.

Advantages. If a traditional birth attendant could be trained to insert such a device properly at the time of delivery, the method could reach large numbers of women in developing countries at a time when motivation to avoid pregnancy is generally high. Unlike the pill, IUDs do not interfere with lactation, and they do not introduce drugs or steroids into the breast milk. Many women in the developing world are not routinely seen by medical or paramedical personnel after the postpartum period, so that it is much more difficult to reach them to insert conventional IUDs during the menstrual cycle.

Drawbacks. The postpartum IUD would possess the same side effects associated with conventional devices — notably, disturbed menstrual bleeding patterns, pain and risk of pelvic inflammatory disease (PID) and, pos-



A 30-day administered menses-inducer would bring on menses, whether conception had occurred during the month or not (above: fertilization in the hamster).

sibly, subsequent infertility. Indeed, these devices may tend to increase postpartum bleeding, spotting and cramps, and special care would be needed to prevent infection. For women who deliver in hospitals, skilled medical services would presumably be available. But traditional birth assistants would need to have special training to insert these IUDs.

Organizations involved. The major organizations involved are the IFRP, which is developing the sutured loop, and the PARFR, which has begun a study of both devices. The ICCR and the WHO have also been involved to a lesser extent in developing such devices.

Current funding. About two percent of current public-sector funding for contraceptive development is going toward research on postpartum IUDS. The IFRP is spending about $210,000 annually on its device, the PARFR has a three-year study under way, with a total investment of $200,000, the ICCR is spending about $15,000 annually at present, and the WHO, about $13,000. In all, the current annual investment in this method is about $300,000.

Future requirements. The current strategy of selecting and testing a very small number of potential designs can probably be executed at current annual funding levels (with allowance for inflation) over the next three to four years. If several designs were tested simultaneously, about five times the current annual funding level would be needed, but a substantially superior product could result within five to seven years.

Institutional constraints. The involvement of industry could speed up the timetable for development of this kind of method, but major pharmaceutical companies are not likely to be interested in developing a low cost IUD for Third World family planning programs. Public sector agencies have attached lower priority to this approach than it would seem to merit, considering the potential worldwide usefulness of such a device. This is perhaps because it has lacked some of the "glamour" attached to such other leads as a male method or oversises inducer.

Different investigators, working independently, have developed their own ideas about optimal design, and they have gone on to manufacture and test these, often using different types of clinical protocols and applying very different scientific standards for evaluating performance. They have tended to place emphasis on proving that their particular designs are superior and worth marketing, rather than working closely with other R&D groups to develop the optimal device even if a longer process of development and testing is required.

Limitations of Current Arrangements And Funding

There is a good chance that some of the methods described in the preceding section could be made available to the public within the next decade *if* public-sector funding for contraceptive development were increased by some four times, *if* donors made that funding available on a secure, long-term basis, *if* there were improved coordination and planning by donors and research programs, *if* there were more reasonable requirements by regulatory agencies and *if* there were more effective harnessing of the potential of industry.

Funding for all contraceptive development programs is shrinking and is increasingly insecure. The United States and other governmental donors have decreased their expenditures for contraceptive development since the mid-1970s. The WHO Human Reproduction Programme, the largest of the five international R&D organizations, is probably going to eliminate its R&D task forces on new male contraceptive agents and contraceptive vaccines because of budget cutbacks from several donors. Budget-tightening by the U.S. Congress has led to constriction of contract programs, precisely the mechanism through which the U.S. government finances contraceptive R&D. None of the R&D programs has been able to keep pace with inflation in recent years, what is more, increased costs for overhead have left relatively smaller proportions of expenditures for actual research. These shrinkages are occurring at a time when R&D costs are increasing because of the relatively large number of potential new methods now in advanced clinical trial — the most expensive part of the R&D process. Because of lack of funds, R&D programs have had to reduce the number of toxicology studies, clinical trials and product formulation efforts that they would otherwise undertake. As we demonstrated in our analysis of five potential new methods, the R&D programs have had for the most part to restrict their work to a few technological approaches, usually the least costly, and they have been unable to pursue multiple avenues of investigation simultaneously in order to speed up the development process.

Funding limitations prevent these R&D programs from making substantial enough investments in longer term mission-oriented research to bring new breakthrough technologies to the general public in the next decade. Indeed, at today's pace of development, most of these methods will probably not reach the market before the end of this century.

Cutbacks in funding have been exacerbated by donor pressures on programs to minimize expenditures in developed countries. Such pressures, although consistent with the objective of developing scientific and technological capacities in Third World nations, are not consistent with the fact that 95 percent of the world's R&D efforts are conducted in developed nations, where the bulk of scientific, technical and engineering capacity is located. This problem is particularly notable for R&D efforts entailing chemical syntheses of new compounds, drug screening, studies of toxicology, studies of the mechanism of action of new agents and of their effect on metabolism, studies of product formulation and the organization and coordination of highly sophisticated clinical trials. The involvement and training of developing-country scientists in these endeavors should be (and has been) pressed by R&D organizations to the extent that funds are available, and more programs of scientific training and institutional development for such countries are clearly needed. But reducing expenditures for R&D in developed countries will inevitably slow R&D efforts. In the case of the largest of the R&D programs, the WHO Programme, these pressures have led to increasing emphasis on clinical trials of existing methods and on operational research involving family planning service delivery. Only one-quarter of the WHO's current research budget is going to contraceptive development.

Beyond problems associated with funding, there are a number of organizational problems that appear to be reducing the effectiveness of R&D programs. Greater coordination among the contraceptive-development organizations — especially sharing of technical information, data, protocols and research plans — could increase efficiency and improve allocation decisions. Senior scientific staff from the six R&D organizations now exchange technical information about various projects on an ad hoc basis, and meet formally each year at a two-day meeting sponsored by the WHO to exchange information about ongoing work and future plans. But such contacts are not sufficient to permit the effective sharing of information about projects that is needed. What is more, the organizations tend — partly out of scientific conviction, but also in order to make their programs more visible and attractive to their donors — to identify themselves with particular technological approaches and undertakings, and to ignore (and sometimes disdain) complementary approaches undertaken by other groups.

In part, this problem stems from a lack of joint planning and coordination among the major donors to these R&D programs. His-

torically, particular donors have been closely associated with particular programs.* The only time the donors meet as a group is at conferences held for a few days every few years to discuss all aspects of the population-related programs that they support. Many governmental donors are poorly informed about programs they do not fund, and they tend to restrict their interests in contraceptive development principally to the activities and functions of the organizations they support. The result has been sharp competition among the recipient organizations to maintain their traditional sources of funding.

Constructive competition, even if it involves some redundancy of effort, is probably desirable in contraceptive research as in other activities. It encourages creativity and exposes waste. The current level of competition, however, has become counterproductive.

As a result of the competition for funds, some investigators have tended to oversell their programs, underestimating the time and funds necessary to bring a new method through clinical testing, or neglecting to make clear to donors that in the very nature of the development process, some promising leads will have to be abandoned along the way. The result has been to make donors impatient with the slow progress between the initiation of an idea and its realization as a marketable method. The paradox is that as donors' interests cool and their pocketbooks tighten, it becomes ever less possible to pursue multiple leads simultaneously — an approach that could produce results more rapidly than the current typical practice of working on one lead at a time.

A different kind of problem arises from the fact that the work of the major R&D organizations is conducted principally by scientists who do not have field experience in family planning programs where the new technologies will eventually be used. Too often, it has been assumed that newer is better, without adequate research into the acceptability or practicality of a particular method under developing-country conditions. In the past few years, the R&D programs with an international focus have made progress in establishing mechanisms to help ensure that the methods they are developing meet the needs of eventual users. One of the R&D organizations, the PIACT, specializes in research related to the adaptation and introduction of new technologies — for example, their packaging, their instructional materials and their shelf life under tropical conditions. Other programs now routinely conduct acceptability surveys as part of their clinical trials of new methods. Nevertheless, the ultimate acceptability of many of the technologies now under development remains uncertain and, in some cases, questionable. Partly, this is because of a lack of suitable research methodologies, but it is also because there continues to be insufficient linkage between the research organizations and the family planning service delivery programs.

Another problem has grown out of the success of the R&D organizations in developing new technologies. From the outset, it was envisioned that these public-sector organizations would rely on private-sector companies for manufacturing and distributing the new products they developed. In some instances, however, difficulties have arisen in establishing a low enough price for the manufactured product so that public-sector family planning programs can afford it. Even when the R&D organizations have been successful (for instance, in the case of the Copper T, which is available to public programs for less than one dollar), problems have arisen in the marketing and distribution of the new products to family planning programs. Although many companies have been willing to manufacture products developed in the public sector, they have not been eager to distribute and promote them at special concessional prices to public agencies through their commercial marketing networks. Consequently, even when the methods are inexpensive, potential public-sector buyers and users of the new technologies in developing countries often fail to hear about them or to learn where they can obtain them. Again, several agencies have begun to address this problem, and one of these (the PIACT) has specialized in this area.

Current drug regulations, especially those promulgated in the United States, constitute another obstacle to rapid development of new contraceptives. Increasingly stringent regulations imposed over the course of the last two decades have tremendously increased the costs and the time required for new drug development in the United States and, to a lesser extent, in Europe as well. The increased costs are alleged to have discouraged industry from participation in birth control research, especially with regard to high-risk efforts. None of the internationally focused applied contraceptive R&D organizations have sufficient funds to take their drug-based potential products through all of the toxicology and clinical trial requirements that the U.S. Food and Drug Administration (FDA) is likely to establish for new chemical entities.

What Can Be Done?

Clearly, the most important action that could be undertaken to spur the development of new and improved contraceptive methods would be the provision of substantial additional funds for this purpose. In the first place, expenditures need to be sufficient to ensure the rapid completion of development of advanced leads already in the R&D pipeline. Second, other methods believed to have great promise for improving control over reproduction among couples in the developing and developed world (such as a male method, an antipregnancy vaccine and a menses-inducing agent) should be selected by donors and programs for large-scale efforts involving simultaneous pursuit of all promising technical approaches. (To produce an antipregnancy vaccine, for example, work would be undertaken on various placental antigens, ovarian antigens, gonadotropin antigens and egg and sperm antigens.) Such projects would require long-term financial commitment, long-term R&D planning and a technological organization of much broader scope than is currently available for pursuit of these important but still elusive leads.

An increase of at least two times current annual expenditures for applied contraceptive R&D will be required to complete the development and fielding of methods now in the R&D pipeline and twice that much again would be needed to take advantage of the most promising opportunities for the five new methods described earlier. In addition, it is essential that donors devise a mechanism to commit such funding on a sustained basis for the 10 years or so needed to bring a new method from the laboratory to the marketplace.†

Increases in expenditures for fundamental research are also needed to nourish contraceptive development efforts and supply new leads when old ones fail to work out. Continued expenditures are also needed for evaluation of safety of existing methods, and of new methods as they are brought to market, to build confidence in these methods and to guard the health of couples who employ them. Finally, ongoing funding is needed to train new scientists and support research institutions to assure continuity of research efforts over the long term.

It is unlikely that such increases will be forthcoming unless there is a radical shift in

*The largest donor, the U.S. government through AID, provides its funds exclusively to the four U.S.-based organizations, two of which it created. Seven of the remaining nine governmental donors provide their funds exclusively to the WHO program.

†Contraceptive development expenditures in the public sector have declined by about one-quarter since 1974 when, it was estimated, a threefold increase was needed to take advantage of current knowledge. To reach that goal would require a fourfold increase. Important new leads uncovered since that time further increase the possibilities for further productive R&D activities.

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donor research priorities. The U.S. National Institutes of Health (NIH) is the world's major funder of reproductive and contraceptive research. Even during the peak of world concern in the early 1970s about the severe social and economic problems engendered by rapid population growth, only two percent of the NIH research budget was devoted to studies in reproduction, and only about four-tenths of one percent was going for applied contraceptive R&D.[10] Today, the proportion devoted to reproductive research is under two percent, and the proportion devoted to contraceptive development is less than three-tenths of one percent.[11] Increases in the share of total funds the NIH devotes to population research could be an appropriate and important source of new money for contraceptive R&D. However, some modification of the current grants and contracts mechanism would need to be devised so that the CPR could provide institutional support to the major R&D programs.

Increased funding from the Office of Population of the AID is also critical for the survival of the four U.S.-based R&D programs. AID support of these programs has come under criticism from some who believe that scientific research is out of place in a foreign assistance agency, and that research activities would more appropriately be concentrated in the NIH. The emphasis of the NIH, however, on the health of Americans rather than on the needs of people who live in developing countries sometimes conflicts with the priorities of the internationally oriented R&D organizations. Broader program support rather than narrowly focused project support by the AID is needed, perhaps with assistance in selecting programs and setting quality standards provided by an outside advisory panel established for this purpose by the AID.

The fact that world population growth rates have begun to slow in a number of countries of Asia and Latin America has led to complacency among some policy-makers that the "population problem" has been solved, and that no major initiatives, such as the development of a new contraceptive technology, are needed. The long time frame that appears to be necessary for the development of any new method discourages those donors who are still convinced of the need for action to meet population problems. Many of them have become convinced that the only solution lies in more efficient organization of services and the initiation of community pressures and incentives "beyond family planning."

In fact, the demonstration of receptivity to family planning efforts in countries around the world, and the responsiveness of couples to these programs as measured by increased contraceptive use and declining birthrates and growth rates is a persuasive argument for assigning high priority to research in contraceptive development.

There is no technological fix for problems engendered by population growth. But new methods of fertility control that better meet individual needs and preferences and that are effective, safe and require less costly and sophisticated delivery systems than those now available can accelerate fertility declines now taking place, as well as help initiate them in places and among couples where current methods are inappropriate. Without sterilization and legal abortion, conventional family planning programs using available methods have limited effectiveness in bringing down birthrates. This is because of relatively high rates of discontinuation as well as problems of acceptability and safety. Religious and political opposition have inhibited the development of sterilization programs and the legalization of abortion in many countries, and will probably continue to do so — especially where legal abortion is concerned — for some time to come. What is more, epidemiologic research has made us aware of the limitations of current methods based on safety problems. Even in developed countries, as we have noted, the inappropriateness of current methods has resulted in continued high rates of unintended pregnancy, though these are masked to some extent by the considerable recourse to legal abortion.

Donors from government, multilateral agencies and private philanthropies have created a highly productive international contraceptive research and development apparatus which, if provided with expanded and continued support, is virtually certain to develop a wide range of extremely useful new birth planning technologies during the next decade. It is to be hoped that greater appreciation of this fact and of the urgent need for new methods will persuade donors to provide the needed additional funds even in the face of the current climate of financial austerity.

Institutional Changes

Whatever the level of funds available, there are a number of changes in institutional arrangements that could help bring about their more efficient utilization. One of these would be insistence of the donors on detailed data-sharing among technical personnel of the R&D organizations that they support. Such data-sharing is unlikely to take place, however, without improved coordination and joint planning among the donors themselves — beyond the annual meeting sponsored by the WHO and the irregular conferences sponsored by the private foundations.

The kind of mission-oriented approach suggested here, involving the simultaneous pursuit of various technological leads to achieve a particular type of method (such as a menses inducer, a male pill or an antipregnancy vaccine), would certainly require — in addition to greatly increased funding — far greater coordination among developers and donors than now exists, in order to choose the methods for research concentration and to allocate the various approaches to those organizations that are best suited to pursue them.

The provision of substantial additional funding is the most important action that could be taken to spur method development.

Various models have been suggested to improve coordination and planning and evaluation. One is the Consultative Group for International Agricultural Research, which coordinated governmental and private foundation efforts to bring about the so-called Green Revolution through applied research to development of new agricultural techniques in Third World countries. The Consultative Group is assisted by a Technical Advisory Committee which monitors progress on various avenues of investigation and helps evaluate which is worthy of further investigation and which should be abandoned.

Another approach that might lead to improved donor coordination and involvement is for the United States government, which is responsible for 60 percent of worldwide reproductive research, to end its refusal to fund the WHO Programme. By taking its place on the WHO's Council of Donors, the U.S. government could seek to encourage that Council to strengthen its role in contraceptive applied R&D.

At another level, it has been suggested that most of the contraceptive development efforts of the AID and the CPR be concentrated in a new international agency, the Institute for Scientific and Technical Cooperation (ISTC), the organization of which was authorized by Congress, but for which no funds have yet been appropriated.

Clearly, further in-depth exploration of feasible means to achieve the kind of coordination needed among donors and programs is required.

In addition to regular data-sharing, R&D

organizations could benefit by strengthening their procedures to periodically assess the potential utility of the technologies they are developing for Third World clients. These assessments could be based not only on formal marketing research studies, but also on informal discussion with service program personnel. They should include analyses of the programmatic requirements of new methods to identify user needs, preferences and potential problems.

Some way needs to be found to speed up the regulatory process for new methods required by the FDA. For example, a comprehensive review and reconsideration of current requirements for animal toxicology might provide a means for developing new sets of standards that would offer greater flexibility and speed. Numerous attempts have been made to change these regulations, without success, because of disagreement among scientists as well as political pressures from consumer advocacy and feminist groups on the one hand and pharmaceutical companies on the other. While it is clearly unacceptable to allow human trials of products which are likely to cause serious health problems, many of the current regulations for clinical trials clearly inhibit and make more expensive the entire process of contraceptive development (and, it should be added, development of all other categories of drugs and devices). Action is needed to simplify regulations without sacrificing health protection. In addition, governments should be encouraged to establish their own standards, based on the risk-benefit equations applicable in their own countries. The WHO's efforts to develop institutional capability in Third World countries is helping to achieve this goal.

The claims of Carl Djerassi and others that industry is refusing to participate in this type of research because costly and time-consuming regulatory procedures have made it unprofitable[12] are probably exaggerated. At least five companies are known to be engaged in research on LHRH, for example, in search of a more acceptable ovulation suppressant than the current oral contraceptive. In certain areas (e.g., vaccines), it is possible that the participation of industry may only be obtained if the government takes over liability coverage, as it did in the case of the mass swine flu inoculations. Government reimbursement for expensive toxicology studies and extension of patent protection may also be needed. Concessions to industry, however, should be carefully hedged with agreements requiring the companies to sell and promote the resulting products at low cost to public-sector programs.

In our view, the kinds of increases in the level and nature of funding that we have discussed, and the appropriate changes in institutional arrangements, could result in the development of major new methods in the next decade that could revolutionize contraceptive practice the world over by greatly increasing rates of acceptance and continuation, while providing options that are as effective as the pill and the IUD, but safer than either of those methods.

It would be unfortunate if donors, feeling the pinch of inflation, impatient with the pace of current progress and complacent over falling birthrates, were to fail to take advantage of the extraordinary opportunity now available to accelerate these declines and help advance social and economic progress not only through improving family planning service delivery, but also by making available desperately needed new methods of contraception.

Exhortation, of course, is easier than persuasion. It is difficult to pry loose increased funding for research in any area in this period of budget tightening, and it is colossally difficult to change the perception of priorities that are built into the funding system. Current institutional arrangements reflect different perceptions of what needs to be done in this field as well as intercountry and intracountry personal and bureaucratic rivalries. Change is always difficult, but in this instance, it is essential. It is urgent that the major governmental and private donors examine the current situation and find ways to solve the problems we have discussed. Perhaps one persuasive means of accomplishing this is the appointment by a consortium of the key governmental and nongovernmental donors of a blue-ribbon international committee of scientists to assess the current research situation and report its findings within a year.

Clearly, if present trends of shrinking real-dollar R&D budgets continue, with the consequent slowdown of R&D activities of the major research organizations, we will certainly not obtain any of the "breakthrough" methods described in this article in the foreseeable future, and we are in danger of further delaying even those methods that are in advanced clinical trial.

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The Improvement of Science and Mathematics Education in Less Developed Countries

A Status Report with Suggestions for an ISTC Program

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This paper was prepared at the request of the Institute for Scientific and Technological Cooperation Planning Office. However, any opinions or recommendations expressed are those of the author and do not necessarily reflect the views of the ISTC/PO.

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I. INTRODUCTION

During the past two decades, an unprecedented amount of activity has taken place in the development of new approaches to the teaching of pre-college science and mathematics. The United States has been the initiator of much of that activity and by doing so has set new standards for other countries to emulate, either by adapting course materials developed in the United States or by initiating indigenous course improvement projects. American scientists and educators have played an important international role in enabling other countries, particularly the less developed nations, to benefit from the work of American course improvement projects by helping groups located in foreign universities and ministries of education to experiment with the new approaches to the teaching of science and mathematics and to adapt them to local conditions.

However, in recent years American contributions in this area have dwindled. Some of the curriculum centers established in the less developed countries with the help of American financial support and expertise have become isolated, both from science educators in the United States and from educational innovations throughout the rest of the world. There is a need to re-establish communication links with these centers and to set up mechanisms for future collaborative efforts to improve science and mathematics education.

This paper will attempt to provide a rationale for the ISTC to undertake this task by (1) reviewing the progress that has been made in the improvement of science and mathematics education in the United States during the past two decades, (2) assessing the impact of previous efforts to improve the teaching of science and mathematics in less developed countries, and (3) outlining some options which the ISTC might pursue in future programming.

II. A REVIEW OF DEVELOPMENTS IN SCIENCE AND MATHEMATICS EDUCATION IN THE UNITED STATES

The school curriculum reform movement in the United States is usually dated as beginning with the launching of Sputnik and the funding of the Physical Science Study Committee (PSSC) by the National Science Foundation in 1957. Although negotiations concerning possible federal financing of curriculum work in physics had preceded Sputnik, there can be little doubt that public embarassment over the Russian launching of the world's first space probe stimulated prompt action and made funding easier to obtain.

An important mathematics curriculum project, the University of Illinois Committee on School Mathematics (UICSM) initiated its work prior to the PSSC project. The UICSM began work on a small scale with local funding to improve the mathematics taught in Illinois high schools in 1951; its first outside funding was obtained from the Carnegie Foundation in 1956.

The UICSM and PSSC projects were important not only in that they set out to make radical changes in the curriculum of the schools, but also because they established a new developmental model for innovation. Prior to the creation of these projects, the curriculum in the public schools was characterized by a high degree of uniformity, maintained by the economics of textbook production and sales which discouraged any deviation from the status quo. When a new textbook was introduced by a publisher, one could be sure that the basic approach and organization of the subject matter would mirror that of those books that had been successfully marketed in the past. Federal financing for curriculum made it possible for the new projects to experiment with innovative teaching

approaches and new ways of organizing course content.

The developmental model of course construction initiated by the new course improvement projects differed significantly from the process traditionally used by publishers to produce a new textbook. Instead of relying on the talents of an individual author or a few co-authors, the developmental curriculum projects enlisted the aid of a group of research scholars and teachers to develop preliminary drafts of new course materials. These materials were then "trial-taught" in several classrooms to reveal the strengths and weaknesses of the proposed instructional sequences and learning activities. During these trials, the authors of the draft materials could frequently be found in the experimental classrooms, either teaching the class or observing small groups of students so as to obtain their reactions to the lessons. Feedback from such trial classes was then used to improve the course materials; often several cycles of classroom trials and revision were carried out before the new course materials were put into their final form.

The National Survey and Assessment of Instructional Materials conducted by the EPIE Institute in 1976 analyzed the benefits that result from such an "R&D" model of course development:

> R&D-based materials are (not) necessarily the "best" or the "right" materials for every classroom, but...they are more likely to perform as promised when used as directed with an appropriated student population. By R&D-based materials, we refer to materials built upon an empirical data base, as opposed to conventional wisdom, and developed through continuous feedback loops that insure that once-obtained data hold steady over time. A traditionally developed material uses little more than "conventional wisdom,"

that is, usually the manuscript is written by a publishing company's editor, who often is a former teacher, and it receives as "input" critical readings by those who are listed as authors and suggestions from sales representatives and production staff members (EPIE Institute, 1977, p. 22).

A traditional model of textbook development was in general use throughout the world prior to the curriculum reform movement. The shortcomings of such an approach were especially serious in the developing countries, where the textbooks in common use frequently were authored by expatriates who had little or no understanding of the local culture. Although some publishing companies had made efforts to commission the writing of textbooks by indigenous authors, too often the contributions of these local authors were limited to the critique of editorial revisions of books formerly written by expatriates. This situation was further complicated in some countries where the local authors were government officials in a position to influence textbook adoptions.

In the following pages, some of the major course improvement projects which comprised the past two decades of science and mathematics curriculum reform in the United States will be reviewed. It is important to note that the curriculum reform movement was not limited to the United States. Parallel developments occurred in a number of countries and some important cross-fertilization of ideas took place, particularly between educators in England and the United States. However, because American contributions to the improvement of science and mathematics education in developing countries have occurred primarily as an outgrowth of curriculum projects initiated in the United States, a review of the principal American projects is most appropriate to the purposes of this report.

As it will not be possible to review all past projects in this paper, readers desiring further information may wish to consult sources such as Goodlad's review (1966) of the early projects, Grobman's (1970) analysis of the course development process utilized by these projects, or the short project summaries published periodically by the National Science Foundation (1974, 1976). In addition, the recent report of the National Research Council's Panel on School Science (1979) provides a comprehensive review of the current state of pre-college science and mathematics teaching in the United States.

Science Course Improvement Efforts

The first generation of federally-financed science curriculum development projects in the United States focused on improving the pre-college education of students who intended to pursue careers in science and engineering. The initial emphasis was to develop radically new courses for the three main sciences taught in high school: physics, chemistry, and biology. In each case, an attempt was made to bring the course content up to date with the currently available knowledge in science. Even more important, the scientists guiding the development of the new courses decided to abandon the traditional practice of using laboratory experiments to verify principles already learned from lectures or the textbook. Instead, laboratory investigations were to be used to introduce students to new concepts. Laboratory activities were designed to encourage students to think inductively so as to develop a personal understanding of each new concept. The intent of the new courses was thus to help students to begin to think scientifically as well as to provide them with an introduction to the scientific discipline concerned.

The new PSSC physics course abandoned the nineteenth century topics

around which high school physics had previously been organized. Instead, PSSC physics followed a sequence that emphasized the alternative conceptual models that could be used to explain the behavior of matter. Considerable effort went into the design of laboratory experiments and simple apparatus, as well as a teacher's guide, films, and books on special topics. Interest i the new course spread throughout the world and twenty-four translations of the textbook and laboratory guide were made for use in other countries.

Two high school chemistry projects were supported by the National Science Foundation. The first, called the Chemical Bond Approach (CBA), resulted in the development of a course that was highly theoretical and may not have been very suitable for the average student. Perhaps for this reason, the CBA chemistry course was never widely adopted. Work on an alternative NSF-supported high school chemistry course was begun in 1960 by the Chemical Education Material Study (CHEM Study). Like the PSSC physics course, CHEM Study chemistry introduces new concepts through laboratory work. The text and class discussions are designed to help students to tie together ideas introduced in the laboratory by means of the kinetic theory and atomic-molecular bonding relationships. The CHEM Study textbook was widely adopted by school systems in the United States and was translated or adapted for use in over twenty foreign countries.

The Biological Sciences Curriculum Study (BSCS) produced three different alternative courses for high school biology, usually known as the green, yellow, and blue versions. Green version BSCS biology emphasizes the biological community, the yellow version stresses cellular biology, and the blue version focuses on biochemistry and molecular

biology. In all of these BSCS courses, students are expected to spend a considerable amount of time performing laboratory investigations. Materials based on the BSCS biology programs are now in use in over sixty countries.

Following the development of these new courses for the three major disciplines in the high school science curriculum, it became obvious to curriculum planners that a need existed to improve the teaching of science at the junior high school level, so as to help students acquire some basic experimental and mathematical skills and to instill a positive attitude toward scientific inquiry. One of the first efforts at this level resulted in the development of the Introductory Physical Science (IPS) course. In this ninth grade course, students examine the properties of matter and assemble empirical evidence that leads them to the development of an atomic-molecular model of matter.

The second course designed to replace the general science courses formerly taught at the eighth or ninth grade level is an earth science course developed by the Earth Science Curriculum Project (ESCP). This interdisciplinary course incorporates topics from geology, meteorology, oceanography, and astronomy. Interest in the teaching of earth science has increased in recent years due to world-wide concern about the depletion of fossil fuel reserves and other non-renewable natural resources.

During the mid-1960's, NSF funding resulted in the creation of three major elementary school science projects: Science, A Process Approach, sponsored by the American Association for the Advancement of Science (AAAS); the Science Curriculum Improvement Study (SCIS), and the Elementary Science Study (ESS). The AAAS elementary science program is structured to encourage children to practice fourteen "processes of

science," systematically defined by means of an elaborate hierarchy of behavioral objectives. The SCIS program stresses a predetermined conceptual framework which children are expected to acquire as they examine natural phenomena, manipulate equipment, and record data. The ESS program consists of a series of self-contained science units; each of these units is designed to encourage children to examine a set of related phenomena, make careful observations, formulate their own hypotheses, and carry out experiments to test their hypotheses.

All of these elementary science programs have been widely adapted for use in other countries. The AAAS materials were adapted for use in Argentina and Chile; SCIS materials served as a catalyst for the development of similar programs in Israel, Brazil, and the Philippines; and ESS stimulated the development of the African Primary Science Program.

In the late 1960's and 1970's, science curriculum development projects funded by the federal government turned toward the development of multidisciplinary materials which included an emphasis on the interrelationships between science and society. This trend has been mirrored worldwide in the series of conferences and reports sponsored by UNESCO on the teaching of integrated science (UNESCO, 1971, 1973, 1974, 1977).

Work initiated by the Harvard Project Physics group in 1964 resulted in the development of a high school physics course intended not only for those students planning scientific careers, but also for those who plan to emphasize college studies in the humanities and social sciences and for those who may not intend to go to college. The new course introduces students to a variety of physics topics, including some of the more recent developments, but also stresses the humanistic background of the physical sciences, how physics has contributed to modern technology, and

the social significance of some scientific advances.

At the junior high school level, the Intermediate Science Curriculum Study (ISCS) developed a three-year sequence of science courses designed to allow the pace level of instruction to be adjusted to the interests and abilities of individual students. The seventh and eighth grade ISCS materials are based primarily on physical science themes such as energy, measurement, operational definitions, the composition of matter, and model-building. In the ninth grade course, the student is encouraged to integrate the experience and knowledge gained in the previous two years so as to investigate a diverse set of problems of practical and scientific significance, on topics ranging from geology and weather to genetics and environmental pollution.

The BSCS Human Sciences Program is another multidisciplinary program for the intermediate level. This program is being developed with a special concern for the interests and developmental characteristics of eleven to thirteen year-old adolescents. Content for the Human Sciences course is being drawn from the biological, social, and behavioral sciences. Learning activities are designed to encourage students to seek answers to questions such as, "Why do things change?" and "Why do living things act as they do?"

Because the United States is not currently suffering from a shortage of trained scientists and engineers, there is now less public concern about the training of future scientists than there was at the time of Sputnik. More stress is now being placed on the need to improve the scientific literacy of the general public, in order to help all people to deal more intelligently with the scientific and technological issues that affect their everyday lives. This task will probably be the focus

of most efforts to improve science education in the United States during the next decade.

Efforts to Improve Mathematics Instruction

The mathematics curriculum reform effort in the United States differed from the efforts to develop new courses in the various science disciplines in that most mathematics course improvement projects spanned several years of the K to 12 mathematics curriculum. In American schools, most students take mathematics from kindergarten through at least the second year of high school. Because the development of a mathematics course for any one year depends heavily upon those skills and concepts already mastered by students, changes in course content usually necessitate a reconceptualization of the scope and sequence of the mathematics curriculum extending over several years.

As mentioned earlier, the mathematics reform movement began with the work of the University of Illinois Committee on School Mathematics. The first efforts of the UICSM project resulted in the development of mathematics course materials for grades 9 to 12. This course sequence covered elementary algebra at the ninth grade; plane, coordinate, and solid geometry at the tenth grade; advanced algebra, including mathematical induction and sequences, at the eleventh grade; and the study of functions, including trigonometry, polynomial functions, and complex numbers at the twelfth grade.

Following the development of this program, the UICSM embarked on the development of a two-year junior high school course for underachieving students in grades seven and eight, particularly those characterized as "educationally disadvantaged." The intent was to give such students special attention at the junior high school level so as to prepare them

for a regular ninth-grade algebra course. The UICSM also developed a new two-year sequence of courses in vector geometry for grades 10 to 12.

Like most of the other mathematics curriculum projects, the UICSM developers attempted to present mathematics as a consistent, unified discipline. However, instead of presenting new mathematical ideas as abstract generalizations, the UICSM program materials attempt to lead students to discover important mathematical principles for themselves. UICSM teachers are encouraged to delay the formal verbalization of new concepts until students have had ample opportunities to become thoroughly familiar with a new idea by testing a number of specific examples. The UICSM materials thus share a common pedagogy with many of the science course improvement projects, but different from the other two major mathematics textbook writing projects (SMSG and UMMaP).

The School Mathematics Study Group (SMSG) is probably the best known of the "new mathematics" curriculum improvement programs. Beginning work in 1958 with National Science Foundation support, the SMSG developed sample textbooks for grades K to 12, designed with the intent of providing a model for commercial publishers to emulate.

The School Mathematics Study Group did not espouse any particular theory concerning the way in which children acquire mathematical concepts, but instead chose to base the organization of the new course materials upon the logical structure of mathematics. In the SMSG elementary school program, children were encouraged at an early age to verbalize abstract mathematical concepts involving the language of set theory and the properties of numerical operations. Although students did manipulate numbers, the primary objective of the SMSG materials was to develop an awareness of the formal conceptual structures of mathematics, not to

help children to become "friendly with numbers."

The SMSG textbooks developed for the junior high school years were designed to provide students with an intuitive foundation for high school algebra and geometry. The seventh and eighth grade texts discuss the concept of a number system, examine geometrical relationships, emphasize the structure of arithmetic from an algebraic viewpoint, and provide an introduction to measurement and elementary statistics. Again, as in the elementary program, a premium is placed on the use of precise mathematical definitions and vocabulary, and the development of an appreciation for the rigor of mathematical principles.

The SMSG texts developed for grades 9 through 12 represented a considerable upgrading of the content and approach of traditional high school mathematics courses. For example, the SMSG ninth grade algebra course incorporates an emphasis on number theory as well as algebraic equations. The tenth grade geometry course includes material on solid geometry and analytic geometry as well as plane geometry, and the eleventh grade course encompasses trigonometry, vectors, logarithms, mathematical induction, and complex numbers. The twelfth grade SMSG course includes the study of elementary functions, and an introduction to matrix algebra and the calculus. The high school SMSG courses were thus similar to the initial science course improvement efforts in that they gave cabable high school students an opportunity to be challenged intellectually to the limits of their ability.

The University of Maryland Mathematics Project (UMMaP) was a third textbook development project. With support from the Carnegie Corporation, this project developed mathematics materials for grades seven and eight, plus an experimental course in mathematics for elementary

school teachers. The junior high school school materials place great emphasis on number systems and the elements of mathematical logic, and are based on an elaborate hierarchical structure of learning objectives.

Two important mathematics course improvement projects did not attempt to write textbooks: the Madison Project and the University of Illinois Arithmetic Project. The Madison Project produced a variety of supplementary mathematics materials for grades 2 to 8 that were not intended to replace the existing curriculum in the schools. Instead, the intent was to improve the existing curriculum by introducing students to some of the fundamental ideas of algebra and coordinate geometry, ideas of logic, and problems relating mathematical ideas to some of their applications in physical science. Learning by discovery and the use of "hands-on" materials were characteristics of the Madison Project approach. Project personnel placed a considerable emphasis on the importance of teacher-training activities.

The University of Illinois Arithmetic Project also placed an emphasis on teacher training and developed a variety of supplementary learning activities for use in elementary school classrooms. The Arithmetic Project course materials do not emphasize mathematical rigor or the learning of the precise formal definitions, but instead provide novel learning tasks and networks of problems by which significant mathematical ideas are introduced to children. An extensive series of films were developed by the Arithmetic Project for teacher training purposes.

In recent years, several projects have been funded to investigate the feasibility of providing computer-based or computer-assisted mathematics instruction in elementary schools. The results obtained when

using these programs with small groups of children are intriguing because of the opportunity the computer provides to accommodate the needs of individual students. However, the costs involved in implementing such programs throughout a school system have thus far been prohibitive in the United States and would certainly rule out the use of such an approach in the less developed countries in the near future.

Lessons Learned through Experience with the New Curricula

There can be no question that the curriculum reform movement of the past two decades has had a significant effect on the schools, both those in the United States and abroad. The State of School Science (NRC, 1979) notes that in 1976 over half of the grade 10 to 12 science teachers in the United States were using one or more of the federally-funded science curriculum project materials. At the junior high school level (grades 7 to 9), 33 percent of the science teachers were using federally-funded materials; for elementary school teachers, the figure was approximately 24 percent.

The utilization figures for federally-funded mathematics curriculum materials are considerably lower: 11 percent for grades 7 to 12 and less than 10 percent for the elementary grades. These low usage figures are partly a result of the fact that many of the federally-funded mathematics course materials were developed with the intention of providing models for commercial textbook publishers to emulate. As a result, some teachers may not have associated a textbook they were using with the materials of a specific federally-funded project on which it was based.

However, it is generally agreed that the impact of the mathematics course improvement efforts was greatest at the secondary school level, especially in grades 9 to 12. After examining current teaching practices,

the 1975 report of the National Advisory Committee on Mathematical Education (NACOME) concluded that the most significant changes in mathematics course content and methodology had affected primarily a small sample of the most capable secondary mathematics students. At the elementary school level, the NACOME report concluded that the impact of the "new math" movement was largely cosmetic. Although the topics covered in some elementary school mathematics textbooks were broadened to include some new emphases, very few teachers allocated much time to the teaching of anything other than the computational skills with which they were most comfortable.

The lack of enthusiasm on the part of elementary school teachers for the "new mathematics" was largely due to the formal and abstract approach to mathematics utilized by most of the elementary mathematics textbook development projects. The attempt to present mathematics as it is conceived and structured by academic mathematicians resulted in an abstract approach which included a considerable emphasis on formal definitions and the introduction of some of the language of sets as early as grade one.

Related to this problem was the limited role played by experienced classroom teachers in most of the elementary school mathematics textbook development projects, and the lack of attention generally given to cognitive studies of the development of mathematical abilities in young children. The result was that many of the projects produced materials that most elementary school teachers did not understand nor judge to be appropriate for use with young children. The response of most teachers was to ignore the proposed innovations.

Many cognitive psychologists, scientists, and educators are now stressing that the aim of mathematics instruction should be to help children learn to solve mathematical problems that are meaningful to them and to recognize a mathematical concept in a real-world situation. They emphasize that children can best learn mathematics by using it as a tool with which to explore the world, and they deplore any tendency to force premature abstractions.

Robert Davis, the former director of the Madison Project, has examined this issue at some length in an article in the Journal of Children's Mathematical Behavior. He concludes:

> The highly-convergent teaching of (say) finite fields to 3rd graders leaves us puzzled. There seems to be no exploration, and we normally regard exploration as the essential core of "doing mathematics." This highly-convergent, highly-directed study of sophisticated subjects for which there is no clear need seems to be based on the notion that mathematics is a very large collection of facts and concepts, such as a knowledge of what fields are. Although we have seen this interpretation of mathematics before, it has never had a very compelling appeal...a body of inert concepts does not constitute the main essence of mathematics as a thing you do.
>
> From our value system, the "new formalism" seems incomprehensible, and potentially harmful. If one accepts the principle of not teaching a topic unless that topic gives the student a new ability to do something that he could not do before...then what valuable new ability does a six-year-old get when he learns the word "set"? We propose further study of this question, but our

present answer is: none that we can identify, and certainly not one that is central and necessary for the process of counting.

Far from giving children a greater ability to solve problems that interest them, the introduction of the language of "sets" serves to create a whole array of new problems, puzzling to children (and teachers), but not of interest to them, problems that do not bring with them commensurate additional power (Davis, 1972, p. 33).

Thus one result of the mathematics curriculum reform movement has been a debate and reconceptualization of the way in which young children should be taught mathematics. However, hindsight suggests another lesson that can be learned from the past two decades of effort: most course development projects in science as well as mathematics suffered from a lack of a systematic approach to program implementation in the schools. In many cases, it appears that government funding agencies have assumed that imaginative and educationally effective course materials would speak for themselves, so that little or no government support would be necessary for their implementation.

However, experience has shown that the educational effectiveness of an innovative program does not provide any guarantee that it will be successfully implemented in the schools. Because most teachers, school administrators, and large school system bureaucracies tend to resist change, specific efforts must be made to address this problem if a new program is to be implemented in the way in which it was conceived.

The report of the National Research Council's Panel on School Science stresses that the experience gained during the past two decades demonstrates that even the best curriculum will not be utilized effectively

unless adequate attention is paid to the following issues:

1. Teachers must be provided opportunities and incentives to acquire the comprehensive training necessary for the successful utilization of the new materials and techniques.

2. Principals should be provided opportunities to gain an understanding of the new programs, for they are key agents for educational change or for maintaining the status quo.

3. New course materials should be introduced in a fashion that encourages the honest exchange of views between teachers and the exponents of curricular innovations.

4. Mechanisms of long-term materials support must be established so that teachers can obtain the instructional materials and apparatus needed for the new courses.

5. Resource personnel should be made available to provide continued expert advice and moral support to teachers and principals when problems arise (NRC, 1979, p. 43).

The need to deal with these issues is not unique to the United States. Problems involving these issues have occured in countries throughout the world, and will be examined in more detail in the next section of this report.

III. An Assessment of Previous Efforts to Improve Science and Mathematics Education in Less Developed Countries

The efforts to reform the mathematics and science curriculum in the United States sparked a considerable amount of similar activity overseas in both the industrialized countries and in the less developed nations. The governments and funding agencies which initiated such efforts in the developing countries placed a high priority on improving the teaching of science and mathematics for several reasons:

1. A good preparation in the fundamentals of science and mathematics is essential for those students who intend to pursue specialized university studies in science and technology.

2. Basic literacy, numeracy, and an understanding of the scientific approach to problem-solving are increasingly coming to be considered as a part of the "knowledge for living" to which every human being is entitled. Many of the new science and mathematics programs are designed to develop rational thinking skills which are needed by all adult citizens.

3. Science education can play a role in helping to solve certain problems of less developed countries, such as the improvement of nutrition and sanitation and the adoption of more effective agricultural practices. The major diseases that afflict people in the less developed countries are not exotic; many could be cured through more effective public health education efforts.

The first of these rationales--the training of future scientists and engineers--was the factor that motivated most of the early efforts to improve science and mathematics instruction in the less developed countries as well as in the industrialized nations. For this reason, most of the

early international education projects funded by technical assistance agencies were focused at the college-preparatory, secondary level. However, in more recent years, attention has been focused on the second and third rationales, with the result that more efforts are now being directed toward the improvement of science and mathematics education at the primary and intermediate levels.

Both through local government funding and with assistance from international organizations, bilateral aid agencies, and private foundations, a considerable variety of projects have been undertaken in the area of science and mathematics education. The most comprehensive description of these projects exists in the eighth, ninth, and tenth Reports of the International Clearinghouse on Science and Mathematics Curricular Developments (Lockard, 1972, 1975, 1977). Robert Maybury's report, Technical Assistance and Innovation in Science Education (1975), contains case studies of five Ford Foundation projects, together with a critical appraisal of the factors that influenced their impact. A UNESCO publication, Innovation in Science Education--Worldwide, written by Albert Baez (1976), former Director of UNESCO's Division of Science Teaching, contains an analysis of past experience and present trends in science education, with special emphasis on the projects assisted by UNESCO. A more recent short review of worldwide trends in science curriculum development can be found in Naama Sabar's article in Science Education (1979).

Innovative efforts in science and mathematics in the less developed countries typically have involved one or more of the following elements: (a) development of new course materials, (b) teacher education efforts, (c) the design and production of instructional materials and equipment, (d) the use of educational technology. In the following section, an effort

will be made to review some important projects in each of these categories so as to determine the lessons that have been learned and to identify the problems that remain to be solved.

The Development of New Course Materials

Direct translations of course materials developed in the U.S

Many of the science and mathematics course materials developed by the large curriculum projects in the United States were translated into other languages for use in foreign countries, including a number of the less developed countries. National Science Foundation records indicate that PSSC Physics was translated into 24 languages and CHEM Study into at least 20. It is not surprising that this should have happened, since most of the pressure leading to the creation of science and mathematics course improvement projects in the less developed countries came from local scientists. These local scientists and the funding agencies which supported many of the projects were attracted to the materials developed in the United States because their content was modern, they placed an emphasis on the study of key principles and concepts instead of the rote memorization of disjointed facts, and they attempted to engage students in some of the processes of scientific problem-solving and inquiry. Undoubtedly, the fact that some leading American scientists had participated in the development of these course materials was also a factor.

However, the effort to transplant course materials designed to fit the culture and conditions which exist in American schools into the very different cultures and school environments which exist in less developed countries resulted in many problems. For example, the early efforts of the Science Education Improvement Project (SEIP) in India consisted of summer institutes for teachers which made extensive use of curriculum

materials developed in the United States which had been reprinted in India by USIS. Although the SEIP summer institutes probably were successful in acquainting Indian teachers with some new teaching approaches and undoubtedly improved their knowledge of science, the teachers were frustrated when they returned to their classrooms because the rigid local syllabus and external examination structure deterred them from implementing most of what they had learned in the summer institutes. In addition, a lack of funds for the purchase of laboratory equipment and supplies made it very difficult for them to utilize the inquiry approach advocated during the summer institutes (NSF Liaison Staff, 1974).

It has been a concern in the United States that some of the projects in the first generation course improvement efforts produced materials that were challenging to the most capable students, but not very appropriate for use with average students or with students who were educationally disadvantaged. The narrow target population of some of the materials, especially in the areas of mathematics and the physical sciences, has sometimes caused problems when direct translations of U.S. materials were made for use in less developed countries.

However, the Science Lycée Project in Turkey supported by the Ford Foundation encountered a different type of mismatch when an attempt was made to introduce the Introductory Physical Science (IPS) materials into the Science Lycée curriculum at the ninth grade level. Maybury (1975) reports that the faculty of the Lycée felt that the IPS materials were "really not very challenging to the children we have at the Science Lycée--(and) inappropriate for the bright children at our school" (p. 131). The IPS materials were eventually adopted for use in the Science Lycee

and were moderately successful. However, when an attempt was made to expand the use of the IPS course into nine other government lycees, the performance of students on achievement tests was only half that of students at the Science Lycée.

Thus it can be seen that the problem of creating course materials that are appropriate to the local situation can be a difficult task, even within a given country. To aid in this task, Maybury proposes five criteria that should be considered before attempting an educational innovation:

1. An innovation should fulfil the value-orientation of those employing it so that, when adopted, it effects that change towards the "better" which they desire.

2. Especially in science education, an innovation should pass the scrutiny of the scientific community in respect to the accuracy and recency of its scientific content as well as the logical coherence of its development of topics.

3. An innovation should possess pedagogical validity, not only utilizing effective techniques but also gearing them to the pupil level for which the innovation is intended.

4. An innovation should slip readily into the school system without clashing violently with constraints of a legal or cultural kind.

5. The costs associated with adopting an innovation should fall within an acceptable range, so that the system can "afford" the innovation (p. 152).

Direct translations of American materials for use in the less developed countries have usually been justified on the basis of the first two criteria, without considering the last two. The issue of whether

the U.S. course materials satisfy the third criterion concerning pedagogical validity and appropriate level continues to generate considerable discussion, both in the less developed nations and within the United States.

Yet, even after recognizing the problems inherent in attempting to make use of direct translations of course materials outside of the cultural context in which they were developed, there are several good reasons why the adaptation of course materials developed in the industrialized nations is often preferable to purely local curriculum development efforts. First, the creation of totally new course materials through a research and development process is a costly venture: NSF investment in the development of the PSSC Physics course amounted to over five million dollars and the three BSCS biology courses cost 10.4 million (NSF, 1975, p. 171). Few of the less developed countries could or should try to replicate such an investment. Second, the recruitment of the professional scientists who worked on the major curriculum projects was a difficult task in the United States, and would be impossible in most less developed countries. Third, once a government commits itself to educational reform it is usually important that results be produced quickly. The most efficient way to produce quick results in curriculum development is to build on the successful efforts that have already been made in other countries. However, it is essential that any borrowed materials be thoroughly adapted to fit local conditions, and used only insofar as they meet local needs.

Local adaptations. Hulda Grobman, in her discussion of the target audiences for which the U.S. course improvement materials were intended, notes that early in its history the BSCS project established a policy of not authorizing direct translations of its materials into other

languages, although it did give permission for adaptations to overseas countries and offered assistance to such adaptation efforts. In the case of biology, the issue was not only that of designing materials to fit the local culture, but also that of making the course content relevant to the local flora and fauna and to the subtleties of the local ecological situation. Grobman (1970) gives the following example:

> According to the BSCS, animal specimens discussed should be those that are indigenous to the country, not those in an imported book. In requiring adaptation rather than permitting translation, the BSCS is trying to avoid the situation reported by a visitor to Hong Kong, where students in a biology class were following the laboratory directions in a British book for the dissection of an earthworm, as preparation for the British University examinations; but the students were dissecting local earthworms. The students' laboratory reports describing their dissections conformed with the information in the laboratory manual, even though the earthworms they were dissecting did not. (p. 136)

Local mores also affect the teaching of biology. Thus in India the dissection of animals in biology classes would cause problems; the discussion of evolution or of genetic differences among races does not.

It might be argued that course materials in some other disciplines such as mathematics or physics might be more "culture-free." However, experience in a number of countries has shown that American materials, even when their content is reasonably appropriate, will not be received as enthusiastically as materials that are produced by a well-planned local effort.

The Science Education Center at the University of the Philippines (UPSEC) was established as a result of one such local course development effort. Its initial task was to adapt the BSCS course materials developed in the United States to the needs of schools in the Philippines. It is unlikely that the pride in local achievement or the commitment of the government to the project would have been as great if a direct translation of the BSCS materials had been attempted. The original project funded by the Ford Foundation and UNICEF was so successful that the Philippine government provided sufficient funding in 1969 to establish UPSEC on a permanent basis so that it could continue to develop science and mathematics materials for schools in the Philippines.

Optimal results seem to be achieved when a curriculum development project in a less developed country utilizes the best programs already developed in other countries as resources to design new course materials that fit the local situation. However, it is essential that such materials then be subject to repeated cycles of revision based on the results of trial-teaching in the local schools. Experience has shown that the most effective way of creating such feedback loops is for the curriculum developers to involve themselves in the classroom trials of the experimental materials.

The African Primary Science Program is a good example of a project which functioned in this way. The project's basic purpose was to introduce modern methods and materials for teaching science into the primary schools of English-speaking tropical Africa. Its specific objectives were:

1. To develop a range of materials using the local environment and covering a wide diversity of science topics.

2. To assist with the establishment of a network of locally-manned and controlled science centers where continuing development might take place.

3. To encourage the formation of an African organization able to provide interested countries with assistance in the area of science education and to conduct various international education activities.

The APSP had a number of unique characteristics as a curriculum project. First, personnel in the various science centers established by the program adopted a truly experimental approach to the development of science units for primary schools. Although frequent use was made of ideas contained in materials previously developed in the U.S. and England (especially the Elementary Science Study and Nuffield Junior Science Teaching Project), the main emphasis of the APSP's work was not on the adaptation of materials developed for use in industrialized countries. Instead, an effort was made to develop learning activities that were modern with respect to content and approach but geared to the realities of the local African situation. Ideas for learning activities were selected that would be relatively easy to teach in simple village schools, using materials that could be found locally. Instructional units were not written in final form until the activities had been successfully taught to children in typical village primary school classrooms. Local primary school teachers were encouraged to participate in this trial-teaching process.

Second, the APSP focused on the development of the child, rather than structuring the program around the discipline of science. APSP science activities were designed to help children to develop cognitive and manipulative skills, as well as curiosity, persistence, self-reliance,

and a respect for scientific reasoning.

Third, the APSP project was unique in that it was a Pan-African program which involved science educators in fourteen different African countries. Experimental versions of materials developed by the APSP were trial-taught in several African countries simultaneously and final versions of the teacher's guides were usually prepared at international workshops that were held periodically in various participating countries.

An African-directed organization, the Science Education Program for Africa (SEPA), was founded to carry on the work of the APSP project. SEPA receives funds for its basic operating expenses from participating African governments, and obtains project funding from a variety of agencies, including both USAID and Unesco.(Dyasi, 1978).

Teacher Education Efforts

The development of new course materials in science and mathematics has placed new demands upon the education of teachers. Although in the early years of the curriculum reform movement, some developers may have cherished hopes that their materials were so well structured as to be "teacher-proof," experience has shown that unless teachers are given adequate training in the use of new materials, very little happens when they are introduced into the classroom except the substitution of one textbook for another.

Because teachers tend to teach as they were taught, any significant change in the curriculum requires a teacher-training effort specifically directed toward the implementation of that change. Science and mathematics course improvement projects have generally incorporated one or more of the following types of innovations: (a) new scientific content, (b) new approaches to the teaching of science, and (c) new kinds of

instructional materials and apparatus.

The new courses have several types of new content that is unfamiliar to most teachers. New concepts are usually emphasized, as well as a more modern treatment of traditional topics. Many of the new "integrated science" courses have a breadth of coverage that extends well beyond the bounds of the discipline-centered academic backgrounds of most science teachers. There is also an emphasis in many of the new courses on societal concerns such as the degradation of the environment and the depletion of natural resources, value-laden areas which most science teachers are ill-prepared to discuss with their students.

The new approaches to teaching utilized in the new courses place even heavier demands on the education of teachers. The most recently developed courses emphasize that teaching should be geared to the cognitive development of the child. This requires a shift in the role of the teacher from the old authoritarian role of one who imparts knowledge to a new role as a facilitator of learning. The new role requires that teachers become adept at teaching children to observe, measure, and predict; to manipulate apparatus; and to construct and interpret charts and graphs. Many of the new courses also include some affective objectives which many teachers have not previously considered to be important.

Most of the new science courses incorporate an emphasis on "hands-on" learning through the use of a variety of instructional materials and apparatus. If new materials and apparatus are to be provided to teachers, it is important that they be taught how to assemble, use, adjust, and repair this apparatus so as to maximize its cost-effectiveness. In cases where teachers are expected to improvise apparatus from local

materials, it is especially important that teachers know how to construct and use such improvised apparatus.

The experience gained from teacher education efforts in the past--both in the United States and abroad--has indicated that too much emphasis has been placed on purely subject-matter training, despite the emphasis in most of the new programs on the adoption of new teaching approaches. This may reflect an assumption that if a teacher is taught the subject matter of a course, and is told to use discussion or inquiry methods, he will do so. However, evaluation studies have provided clear evidence that this approach is not usually effective (Grobman, 1970, p. 164).

If changes in teaching methods are required, then teacher-training programs must focus on the new methods. Perhaps the best strategy for providing this training is to actually give teachers an opportunity to work with the materials they will later be using in their classrooms.

Such activities were a basic feature of the summer inservice training institutes for secondary school science teachers sponsored by the Brazilian Foundation for Science Education Development (FUNBEC), which was founded by Isaias Raw. In these institutes, teachers performed and discussed some of the basic experiments in the new FUNBEC courses, observed classes being taught with the materials, and taught selected portions of the new materials either to demonstration classes or to other teachers participating in the program. More recently, FUNBEC has turned to the training of leaders to staff a national network of six centers for the inservice training of science teachers (CECI).

Curriculum reform projects often begin with an emphasis on inservice education as a means to secure rapid implementation of the program in existing classrooms. As time goes on, and the new program becomes

adopted as part of the regular curriculum of the schools, it becomes necessary to upgrade the pre-service education of new teachers. However, the reform of pre-service teacher education can prove to be one of the most thorny problems confronting curriculum innovators, since tutors in teacher-training colleges often view curriculum reforms as a challenge to their special areas of expertise.

One institution that has been especially effective in the improvement of pre-service teacher education is the Science Education Center at the University of the Philippines (UPSEC). As mentioned earlier, this center grew out of early efforts to adapt the BSCS materials for use in the Philippines. Although the initial emphasis of its activities was on curriculum development, it later began to focus on the improvement of science teacher education.

A scholarship program funded by UNICEF and the Philippine National Science Development Board brings forth teacher educators to the center each year. These science educators, who come from thirteen teacher education institutions located throughout the Philippines, are enrolled in an 18-month program designed to improve the subject area background of the participants, expose them to new developments in science education, train them in new teaching and evaluation techniques, and help them to develop new approaches to the education of teachers. Teacher educators who have completed this program take back to their teacher-training institutions the basic equipment needed to conduct pre-service training programs for teachers. Five of the thirteen teachers' colleges participating in this program have been designated as Regional Science Teaching Centers, and work closely with UPSEC in the dissemination of new curriculum materials (Garcia-Roque, 1974).

The Design and Production of Instructional Materials and Equipment

The findings of cognitive psychologists concerning the importance of concrete experiences in the development of abstract reasoning have supported the intuition of the early curriculum reformers who made "hands-on" activities a central feature of their new courses. Whereas in the past, schools may have attempted to economize by conducting many experiments as teacher demonstrations, today most educators realize the shortcomings of such an approach.

Problems associated with imported apparatus. Providing schools with an adequate supply of equipment and materials for the teaching of science and mathematics has posed a serious problem for most of the less developed countries. The disadvantages of importing educational supplies and apparatus from industrialized countries are well-known to anyone who has worked in the schools of a developing country. First, such imported items are extremely expensive, due both to shipping costs and to the relatively high cost of labor in industrialized countries. Aside from the expense to the purchaser, the importation of equipment also requires foreign exchange. Once a piece of apparatus has been obtained, often after a delay of many months, one still faces the difficulty of obtaining the expendable supplier necessary to operate the appartus over a period of several years. If a piece of apparatus breaks, there is a similar problem of obtaining spare parts and if factory repairs are required, shipping costs may be prohibitive.

In addition, there is undoubtedly an unhealthy psychological effect on teachers and students if items of basic educational equipment that could well be manufactured locally are always imported from the industrialized nations. If every time a class is called upon to do a scientific

experiment, they must work with apparatus imported from Europe or the United States, students are likely to get the idea that scientific endeavors are solely the province of the industrialized nations.

There is also a danger, especially at the elementary school level, that the "standard" science equipment imported from the major commercial suppliers may not be designed to fit the needs of the local curriculum. Earlier it was stressed that developing countries need to mount their own curriculum development efforts to produce textbooks and instructional materials that adapted to local needs and conditions. This course development process should also include the design of laboratory activities and the apparatus needed to perform these activities. A requirement to use the standard apparatus found in the catalogs of commercial equipment suppliers would compromise the effectiveness of the course development process considerably.

Many of the new science course development projects in the United States did design new types of apparatus for student investigations. This was done partly to reduce equipment costs so as to encourage the adoption of the new programs in school systems with limited budgets. The Physical Science Study Committee, for example, pioneered in the development of inexpensive but functional designs for student apparatus that could be constructed from wood, chipboard, and mass-produced hardware items such as doorbells and roller skate wheels. Such equipment was much less expensive to produce than the traditional designs which had been manufactured to close tolerances from machined brass and polished mahogany.

The Introductory Physical Science (IPS) project continued this approach in the development of a series of chemistry experiments for junior high schools that could be performed with the use of a simple

pegboard stand, to which broom clips could be bolted to mount test-tubes, alcohol lamps, and other pieces of apparatus. At the elementary school level, the Elementary Science Study used a similar approach to develop designs for simple equipment that could be constructed from inexpensive materials.

Although the new apparatus designs were originally developed primarily to reduce costs, the use of unsophisticated apparatus has resulted in some important pedagogical benefits as well. If students in a introductory science course are required to use complicated-looking pieces of apparatus, replete with knurled knobs and vernier scales, they are likely to be intimidated and may revert to a cookbook style of doing experiments. The use of simpler apparatus, constructed from easily recognizable materials, is more likely to encourage students to strike out on their own, experimenting with making impromptu adjustments to discover "What happens if...?" The confidence gained from such successful encounters is an important outcome of elementary and secondary school science education, although not something that is usually measured by achievement tests.

The use of simple apparatus manufactured from familiar materials is especially important in rural areas where there may be a tendency children to attribute magical causes to scientific phenomena. If such children are to develop a sense of "fate-control" and a capacity for making rational decisions concerning the adoption of improved health practices or agricultural technology, they need to begin working with simple concrete problem-solving materials early in elementary school, so as to develop a capacity for detecting cause and effect relationships.

Improvised science apparatus. Several international development assistance agencies have supported the development of publications to help teachers construct simple science apparatus from common materials that can be found locally. Probably the best known of these publications is the UNESCO Source Book for Science Teaching (1973), which describes the construction of hundreds of pieces of apparatus for teaching science, with emphasis on the primary and early secondary levels.

The science units developed by the African Primary Science Program include many suggestions for equipment that can be improvised by teachers from materials that might be obtained in a local market. Another source of ideas is the series of three books on improvised science equipment published by the University of Maryland Science Teaching Center (Melton, 1972). The three volumes in this series (on biology, chemistry, and physics) include a variety of designs for simple science equipment collected from projects throughout the world.

However, it is one thing for a science teacher to construct a few items of improvised apparatus in order to present a demonstration for his class; it is a task several orders of magnitude larger to construct enough apparatus to enable an entire class to perform science activities throughout the school year. It is unrealistic, particularly at the secondary school level, to expect that many science teachers will be able to find sufficient time or materials to perform such a task. Even the simplest kinds of materials cost some money and take time to gather and assemble.

Some countries have set up arrangements to supplement materials obtained locally with a limited selection of simple science apparatus obtained through UNICEF. The Papua New Guinea Primary Science Project

is a good example of such a project. UNICEF supplied this project with sixteen types of simple apparatus for children and about twenty additional kinds of materials for teacher demonstrations. The children's materials supplied included items such as alcohol burners, beakers, rubber tubing, magnets, magnifiers, and flashlight bulbs; materials for the teacher included test tubes, a thermometer, and chemicals. The remainder of the materials needed for the science program are common domestic items such as torch batteries, mirrors, razor blades, candles, and balloons that can be obtained locally.

With the assistance of UNESCO, UNICEF has now produced a guidelist of standard science teaching equipment such as that used in the Papua New Guinea project. The items on this list, called the EVE list, are stocked at the UNICEF warehouses in Copenhagen and supplied to projects in developing countries at a low cost made possible by bulk purchases (UNICEF, 1973).

The use of cottage industry. Another mechanism to increase the supply of science apparatus and materials in schools is the development of a local cottage industry to construct simple science apparatus. This has been done in several countries by the African Primary Science Program (now the Science Education Program for Africa) in order to provide teachers with kits of the simple science apparatus specified in the various APSP units. At the APSP centers in Tanzania and Uganda, unskilled primary school graduates were hired and trained to construct simple apparatus such as bead microscopes and kits of materials for the APSP units. These kits were then supplied to the teachers who attended in-service training institutes.

It has also been possible in some countries to work with pre-service teacher training institutions so as to provide the new graduates of these colleges with science kits. One way in which this can be done is to set up a workshop at the teacher-training college and provide student teachers with the tools, materials, and time to construct their own kits of apparatus during their residence at the college. An added benefit of such an arrangement is that teachers are equipped with the skills necessary to repair or replace their equipment when it gets broken. Obviously, such an arrangement is most suitable for the elementary school level, since the necessary apparatus can frequently be constructed from wood, using simple hand tools.

The use of plastics. The use of plastics for the local construction of apparatus is also feasible. In many developing countries, small plastics factories are in operation for the manufacture of domestic items such as basins and bottles. In Tanzania, it was possible to have such a factory design a mold to manufacture geometrical attribute shapes. A set of these shapes can be used in a variety of ways to teach classification skills to elementary school children.

A variety of plastic molding techniques have been used by recent science course development projects. In the United States, the Science Curriculum Improvement Study has demonstrated the practicality of using vacuum-forming techniques to manufacture simple science apparatus for elementary schools. Injection-formed plastic apparatus is used in the physical science courses developed by the Intermediate Science Curriculum Study. If suitable precision molds and dies can be obtained, there is no reason why local plastics industries cannot manufacture similar apparatus for use in the developing countries.

Large-scale equipment production center. A number of countries have set up large-scale national science equipment manufacturing operations. One of the earliest such efforts was the Science Equipment Workshop established at the Rangoon Arts and Science University with the help of Soren Hakansson, a UNESCO advisor, who has helped to set up many of the apparatus production schemes in South East Asia. The production unit in Burma began producing physics and chemistry equipment in 1965 for 450 state High Schools. By 1972, production had increased to a level of 40,000 U.S. dollars worth of equipment per year (Warren & Lowe, 1975, p. 20).

Attempts have been made to establish facilities to develop or produce school science equipment in many other countries, especially in South East Asia. In a few countries, such as Sri Lanka, the model established in Burma is used, where the production of science equipment occurs at the government facility itself. In other countries, particularly those with an established tradition of small-scale manufacturing, the government science equipment center develops equipment designs, produces and tests pilot models to ensure their suitability for use in the schools, and attempts to encourage private manufacturers to undertake the mass production of the perfected designs. This is the approach used in the project being undertaken by the National Council for Educational Research and Training (NCERT) in India to supply kits of science apparatus to the primary and secondary schools. At the primary level, the NCERT workshops produced prototype kits. UNICEF then supported the mass production of these kits by local industry. As of 1975, 20,000 NCERT primary science kits had been produced. However, this was a small fraction of the total need, since there are 500,000 primary schools in India.

Malaysia provides a very successful example of how the local production of school science apparatus can be managed. The Curriculum Development Center in Kuala Lumpur develops new prototype equipment designs, and helps local manufacturers with the development of new manufacturing techniques. It has been estimated that Malaysia now manufactures more than half of its secondary school science apparatus requirements.

The Center at Kuala Lumpur has been assisted in its work by the Regional Center for Education in Science and Mathematics (RECSAM) in Penang, Malaysia. RECSAM was established by the South East Asian Ministries of Education Organization (SEAMEO), and serves Thailand, Malaysia, the Philippines, Indonesia, Singapore, Laos, and Khmer. In addition to sponsoring conferences and teacher-training activities, personnel at the RECSAM center have developed some prototype designs for science apparatus.

In Thailand, the Institute for the Promotion of Teaching Science and Technology (IPST) was established in 1971 with UNDP funding to develop course materials and apparatus for secondary school biology, chemistry, and physics, as well as a course in integrated science for the lower secondary level. Production runs of as many as three hundred pieces of prototype apparatus were manufactured at this center in order to supply equipment to the trial schools and teacher-training colleges. The large-scale production of school science equipment for schools in Thailand is to be undertaken by the Kuru Sabha Company, which is a commercial enterprise of the Teachers Association of Thailand. IPST personnel will assist with the development of large-scale production designs (Sapianchai & Aylward, 1977).

The educational system in the Philippines has not found a satisfactory solution to the problem of supplying science apparatus and supplies to the schools, particularly at the primary and intermediate levels. As described earlier, the University of the Philippines Science Education Center (UPSEC) has been very active in curriculum development and in assisting the teacher-training colleges with the dissemination of the materials produced at the Center. However, it was assumed that the manufacture of materials and apparatus could be left to local industry. Unfortunately, private manufacturers have not shown much interest in the educational market, perhaps because there is very little certainty that schools will be provided with sufficient funds to purchase science equipment, even if it is produced economically. A UNESCO-UNDP study was commissioned in 1972 to examine the problems of supplying science equipment to Philippine schools. It recommended that a pilot production unit be established to demonstrate to local industry the feasibility of local production, but no action has yet been taken on this recommendation.

In Latin America, the most successful and largest-scale effort for the local production of science apparatus has been at the Brazilian Foundation for Science Education Development (FUNBEC). Originally known as IBECC, FUNBEC was established by Isaias Raw in 1952 to assemble science kits for high school students. These kits were marketed directly to students through commercial channels, and students who purchased the kits also received a monthly science magazine. The science kits were so well received that in 1954 the Sao Paulo State educational authorities and the Brazilian Federal Ministry of Education requested that IBECC begin supplying science equipment to the schools. By 1960, IBECC had supplied

science equipment to over 2000 Brazilian secondary schools.

Although IBECC eventually expanded its role to include the development of a wide variety of science currriculum materials for the schools, the emphasis on providing an alternative mechanism for teaching some students directly through small science kits has remained. Isaias Raw described his rationale for this approach in a report written in 1960:

> To achieve quick results and not to abandon the present generation of students completely, we decided to work directly with them. This approach has the advantage of avoiding all the school problems. The method employed is again laboratory experiments. Students are supplied, at cost price, with small laboratory kits.
>
> These kits are not used as toys but to conduct experiments and help good students to develop a scientific mind; to enable them to conduct experiments and reach conclusions by themselves, the purchaser of the kit is supplied with a free monthly journal that contains experiments (Maybury, 1975, p. 27).

In recent years, FUNBEC has been responsible for the design of a series of fifty pocket-book size science kits which are marketed on newstands throughout Brazil. Each kit contains the biography of a great scientist as well as an experiment illustrating his work, which can be performed with the help of the simple materials and instruction book provided in the kit. In addition, there are three volumes of a text which can be obtained separately. The entire set of materials is imaginative and designed to appeal to young scientists on its own merits.

This FUNBEC commercial venture is one of the few institution-based equipment production units that has actually shown a profit. In both

the less developed nations and the industrialized countries the viability of both public and private production units whose sole purpose is to manufacture equipment and materials for use by schools is questionable unless careful advance planning is done. Large capital investments in sophisticated manufacturing equipment cannot be justified unless the estimated production volume is large enough to pay for the tooling costs. The estimated production volume unfortunately cannot be based on educational needs; instead it must be based on a pragmatic assessment of the school system's wants, which must in turn be based upon the funds that can be made available by the government.

However, given sound planning, a publicly-owned manufacturing unit theoretically can produce school science equipment and materials at a lower cost to the government than would be possible relying totally on the private sector. In most countries, privately-manufactured educational materials and equipment are relatively expensive, not only because of the need for a reasonable profit margin but also because considerable capital must be tied up in shelf inventories of stocked items, due to the highly variable and difficult to predict school market demands. Publicly-owned production units whose sole purpose is to manufacture items for use by government schools should be able to scale their production precisely to a predetermined demand, and thus produce apparatus at a lower cost to the government.

In many countries, total self-sufficiency in the manufacture of science apparatus may not be cost-effective. However, past experience indicates that considerable savings can be accomplished even in small countries by setting up local instructional materials processing centers that can use local labor to assemble apparatus from some local materials

and some imported parts. Usually the necessary imported parts can be purchased in bulk from the original manufacturers much more cheaply than the prices charged by the traditional distributors of school laboratory equipment. Items commonly used for purposes other than education, such as automobile battery chargers, hospital glassware, and many hardware items can be obtained more cheaply than items designed solely for use in schools. Such modifications as are necessary can often be performed efficiently by local production units with a modest amount of power wood-working and sheet-metal forming tools.

The Use of Educational Technology

Distant teaching systems. For a number of years, educators have been looking for ways by which modern technology might be used either to improve the quality of education in less developed countries or to increase its cost effectiveness. One of the approaches that has received considerable publicity has been the use of public media such as television and radio for "teaching at a distance."

The educational potential of television broadcasting has been demonstrated on a large scale in the United States by the programs developed by the Children's Television Workshop and by the Open University courses developed in England. However, the expenses involved in the development of quality television programming, as well as the costs of transmitting and receiving equipment, make television impractical for use as an educational medium in most of the less developed countries.

The use of radio for educational programming is considerably less expensive. Radio receivers are comparatively inexpensive and can be operated on batteries in rural areas where mains electricity is unavailable.

The Stanford Radio Mathematics Project in Nicaragua has demonstrated the feasibility of using radio programming to improve the computational skills of children in the primary grades. Although the development of the series of daily radio broadcasts in Nicaragua was quite costly, evaluation of the project revealed that student repetition rates had been sufficiently reduced to offset the program development costs (Searle, Friend,& Suppes, 1976).

The Radio Mathematics lessons were designed to encourage the active participation of students, using simple materials such as seeds, bottle tops, and stones. During the broadcasts, students were required to respond at an average rate of five responses per minute; these responses could be oral, written, or involve physical movement. As a result, program evaluators found that students participating in the radio lessons were more actively involved in the learning process than those in traditional Nicaraguan classrooms (Suppes, Searle, & Friend, 1978).

However, distant teaching does have some inherent limitations and is undoubtedly more suited to the development of simple skills than to the teaching of more complex conceptual material. The experience of the Open University in England suggests that, to be fully effective, one-way media presentations need to be supplemented with opportunities for face-to-face teaching. It is also important to recognize the difficulty of tailoring distant teaching programs to the culture and world view of the listening audience. The extensive feedback system that is necessary to perform this task can make the development of programs quite expensive.

Other educational media. In addition to educational broadcasting, modern technology has provided teachers with a large variety of devices

which have a potential for enhancing classroom instruction. "Multi-media instruction" covers a wide variety of instructional techniques, including the use of video-taped television programs, computer-based instruction, motion pictures, audio tape recordings, overhead projection transparencies, and 35 mm filmstrips and slides.

All of these techniques can be educationally effective, but their use in a given situation must be carefully weighed in terms of local conditions and other competing needs. Clearly, some educational technologies are more appropriate than others for use in the less developed countries.

However, because sophisticated educational technology is glamourous, it is often purchased by schools for the sake of prestige rather than utility. Warren and Lowe describe a case of a Vietnamese educational official with such an orientation:

> In a recent conference, the Vietnamese delegate officially reported his country's difficulties in terms such as "How can we get an overhead projector easily?" "How can we buy a video recorder without tax?" Meanwhile, the morning's newspaper (which the conference delegates had just read) carried pathetic pictures of children taking home-made desks along to sit on the beach near Quang Tri. Formal reports at international conferences often do not show the truth, and this in no way helps donors to hit the right level of international aid. The USAID program has supplied Vietnam with one hundred movie projectors; the Overseas Technical Agency of Japan has given video-tape recorders to set up an audio-visual center. Yet, in most Vietnamese schools there is no electricity; only a few of the largest schools have a laboratory; and there are no repair facilities except in the central workshop in Saigon (Warren & Lowe, 1975, p.31).

In general, the sophisticated hardware that is available for use in schools is not matched by educational software of comparable quality. Albert Baez, former Director of UNESCO's Division of Science Teaching, recommends that ministries of education in less developed countries concentrate on the development of software which can be used with relatively inexpensive equipment, such as 35 mm slide-tape programs. Such software is not difficult to produce with modest resources and can provide considerable visual enrichment (Baez, 1976, p. 177).

In 1972, UNESCO held a meeting on new trends in the utilization of educational technology for science education in Montevideo, Uruguay. At this meeting, Isaias Raw, director of the FUNBEC center in Brazil, expressed a concern about the possible misuse of educational technology and cautioned the less developed countries not to place too high a priority on the acquisition of sophisticated equipment:

> In analyzing the use of educational technology in science education, a distinction is made between education and passive aquisition of information. The role sought for educational technology in in science education is that of providing active learning and individualized instruction, so as to cope with different learning styles, learning rates, and varieties of interest. . . ... This is a goal barely touched upon by the major stream of educational technology which is often conceived merely as a large-scale replacement of the lecture.
>
> As most schools in the less developed world are devoid of even the simplest slide projectors, the priority there should be, not for the teacher-aiding tools, but for low-cost laboratory equipment and other materials for student use. The less wealthy countries could

put more efforts in designing sets of multi-media units combining printed matter, short films, slides, and low-cost laboratory kits (Baez, 1976, p. 163).

IV. Programming Recommendations for the Institute for Scientific and Technological Cooperation

The Need for ISTC Programming in the Area of Science and Mathematics Education

A recent paper prepared by the Committee on the Teaching of Science of the International Council of Scientific Unions (ICSU) stresses the need to include mechanisms to improve the effectiveness and quality of science and mathematics education in the less developed countries as a part of any plans to utilize science and technology for development. Although prepared for the United Nations Conference on Science and Technology for Development (UNCSTD), this report provides a clear rationale supporting the inclusion of programs to improve science and mathematics education as one component of ISTC's activities:

> It is our opinion that the healthy growth of science and technology in any country depends critically on the availability of technically and scientifically trained manpower and that it is the responsibility of the indigenous educational system to provide such manpower.
>
> Furthermore we would maintain that the successful exploitation and assimilation of scientific and technical developments can only proceed with the support of an interested and informed public. The responsibility for fostering this interest, and for ensuring that the public is properly informed rests clearly with the educational system of the country concerned. Any policy that fails to recognize the importance of these two factors can, at best, produce only short term improvements; at worst the country concerned could exper-

ience serious failures in technological development.

Long term sustained growth can be assured only if the money invested in science and technology is matched by the provision of funds for complementary educational programmes directed both to the preparation of scientists and technologists and to the improvement in scientific literacy of the population as a whole (ICSU, 1978, p. 5).

In particular, the ICSU report indicates that the following kinds of efforts are needed:

> In order to promote self-reliance and understanding there needs to be a massive reappraisal of the content of existing courses, at school and at the university, if they are to reflect the needs of the developing countries.
>
> It is also accepted that there is a need to change attitudes and this requires the development of new teaching techniques. For this there must be substantial assistance for the provision and support of teacher-training and teacher re-training. . . .
>
> There is also a considerable need for the development and production of low-cost locally-produced equipment and teaching aids. A number of developing countries are working on this, . . . but further support is necessary (ICSU, 1978, p. 10).

Many American scientists and educators have been involved in the past in efforts to improve science and mathematics education in the less developed countries. However, much of this assistance has been ad hoc and dependent upon chance encounters between individuals. The lack of long-term coordinated efforts to provide assistance and maintain contact with science education centers overseas has caused personnel in education projects initiated with U.S. assistance to become isolated from new developments

in science and mathematics education and from colleagues in the United States who might be able to assist them. The recommendations in the following pages will suggest ways by which this situation might be changed.

Science and Mathematics Curriculum Development

Only a few countries in the world possess sufficient resources -- including both money and the necessary trained scientific manpower -- to create totally new curriculum materials for all educational levels. For this reason, many developing countries have taken the shortcut of adapting course materials developed elsewhere. This process is most successful when the most suitable elements are selected from a variety of project materials, so as to synthesize a new course that best fits local needs and conditions (Blum, 1979).

The United States is in a position to be of considerable assistance in these efforts, since it occupies a position of leadership in science and mathematics curriculum development. ISTC efforts in this area should focus primarily on helping science teaching centers in the less developed countries with the identification, adaptation, and synthesis of course materials so as to meet local needs and on improving local capacities for science and mathematics curriculum development.

However, it will be difficult for the ISTC to be effective in improving science and mathematics education in less developed countries if its mandate requires it to be strictly problem-centered, since education is a specifically national concern and solutions to educational problems must be designed to fit local institutions and conditions. Although there are some regional organizations, such as the Science Education Program for Africa (SEPA) and the Regional Center for Education in Science and Mathematics in Malaysia (RECSAM), that have achieved a

degree of cooperation between groups of countries, in many other instances this type of regional cooperation will not be possible. If ISTC is to be maximally effective, it will need to undertake pilot program efforts in specific countries. It should then be possible to share the benefits of such pilot porjects with educators in other countries through the development of institutional networks.

In many less developed countries, science and mathematics education specialists experience a feeling of isolation due to a lack of colleagues with whom they can communicate on a professional level. This situation has worsened in recent years due to cutbacks in funding for international curriculum development activities by the major foundations and technical assistance agencies.

A related problem is the difficulty which many educators in small countries experience in keeping abreast with recent educational developments in the West, since professional publications are expensive and difficult to obtain in many countries. ISTC support for the establishment of a communication network and international resource center for science and mathematics education would help to alleviate these problems.

Recommendation 1. Accept proposals from curriculum development centers in the less developed countries to supply U.S. scientists and educators to work collaboratively with local personnel on the development and implementation of new science and mathematics course materials. The objective of such efforts would be to share new developments in science and mathematics education and to improve local curriculum development capabilities.

Recommendation 2. Support the establishment of science and mathematics education centers at universities in the United States with a focus on the training of LDC educators from a particular geographical region. These

centers could be modeled on the program established at the University of Wisconsin by Milton Pella to train science educators from the Arab countries of the Middle East. Consideration should be given to the establishment of training grants and postdoctoral fellowships as well as academic degree programs.

Recommendation 3. Establish internship programs at curriculum development centers in the United States such as the Lawrence Hall of Science and the Biological Sciences Curriculum Study (BSCS). Such programs could operate independently as one-year internships or be set up as summer programs to complement the university training of students from less developed countries in U.S. institutions.

Recommendation 4. Sponsor internship programs for LDC science and mathematics educators at established national curriculum development centers in the less developed countries or in conjunction with regional institutions such as SEPA and RECSAM. Such internships would facilitate the development of linkages to encourage cooperation between developing countries in the area of science and mathematics education.

Recommendation 5. Encourage the development of networking arrangements that will encourage scientists and educators from the less developed countries who are engaged in science and mathematics curriculum development work to share experiences and materials, as well as plan new approaches. This function could best be achieved by a small ISTC education staff which could identify groups of people with common interests, organize meetings to discuss common problems, and present progress reports on new projects. Some of these meetings might be held at science education centers in the developing countries, so as to enable participants to visit successful projects in the host country.

Recommendation 6. Establish a science and mathematics education resource center that would help keep educators in the less developed countries up to date on recent developments and research in science and mathematics education. The staff of such a center could respond to inquiries from developing countries with a brief analysis of projects currently underway, plus suggestions regarding key individuals and institutions that might be able to provide additional assistance. Although such a center could be located at a university, some important advantages might result if the center were to be located at the ISTC office. This would enable ISTC personnel to be at the center of the proposed communication network, rather than at its periphery. By mazimizing feedback from the field, such a center would help to ensure that ISTC programming would remain realistic and relevant to actual needs in the less developed countries.

Teacher Education

Although the large-scale implementation of programs in the less developed countries must ultimately be carried out by local personnel, there is a need to learn more about how science and mathematics education programs that have been found to be effective on a trial basis with small groups of teachers and students can be implemented effectively by large numbers of teachers. Studies of effective implementation strategies and research into the processes involved are both needed.

The development of new approaches to the pre-service and in-service education of science and mathematics teachers is essential if course improvement programs are to result in substantive changes in the way students are taught. In order to plan such new approaches to teacher training, it will be important to collect better baseline data about the

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current state of science and mathematics teaching in the countries concerned.

Recommendation 7. Support the development and documentation of effective models for the improvement of pre-service and in-service teacher education in science and mathematics.

Recommendation 8. Support the development of new materials for the education of science and mathematics teachers which might be used to introduce teachers to new approaches to science and mathematics instruction. Some excellent teacher education materials have already been developed by several projects in the United States, such as the ISCS Individualized Teacher Preparation Program modules (ISCS, 1975) and the Science Teaching and the Development of Reasoning units developed at the Lawrence Hall of Science (Karplus et al, 1977).

Recommendation 9. Initiate studies to document current practices and problems in pre-university science and mathematics education in the less-developed countries in a given geographical region. Such studies could be modeled on the Case Studies in Science Education completed by Stake and Easley (1978) to assess the situation in American schools for the National Science Foundation. Such studies could provide information on the kind of science and mathematics education that is actually occurring in the elementary and secondary schools as well as the teacher training colleges of a given region, and would provide a basis for designing future teacher-training and course development programs. Hubert Dyasi of the Science Education Program for Africa has already made a proposal to ISTC to carry out such a study for Sub-Saharan Africa.

The Production of Low-cost Apparatus and Teaching Materials

The Commonwealth Secretariat has sponsored three conferences in recent years to discuss alternative approaches to the local design and production of school science equipment. Three regional seminars have been held in Nassau, Bahamas in 1976; Dar es Salaam, Tanzania in 1977; and Papua New Guinea in 1979. The reports of the first two conferences have been published by the Commonwealth Secretariat (1977a, 1977b), as well as a report which describes in detail four existing materials production centers which are now functioning in the less developed countries (Apea & Lowe, 1979).

These reports indicate that local science equipment production centers can be a viable and potentially useful element in a country's development effort. Because the United States has considerable expertise in the design and production of low-cost science apparatus, this is an appropriate area to provide collaborative assistance to the less developed countries through the ISTC.

Recommendation 10. Provide funding for studies to demonstrate the feasibility of establishing centers for the local manufacture of science instructional materials and apparatus in countries where such institutions do not presently exist. Such feasibility studies should include small-scale efforts based at teacher-training colleges and technical schools as well as large-scale manufacturing operations that serve an entire country.

Recommendation 11. Establish, through Volunteers in Technical Assistance (VITA) or a similar organization, a network of volunteer technical consultants who can communicate directly with personnel in overseas science equipment production centers to provide assistance with the

design of low-cost apparatus and manufacturing techniques. VITA is already operating such a volunteer consultant service in the area of appropriate technology.

Recommendation 12. Provide short-term consultants from the United States to work collaboratively with personnel at existing centers for the local production of science equipment in the less developed countries to perfect apparatus designs and manufacturing techniques.

Educational Technology and Out-of-School Learning

One focus of ISTC programming in the area of educational technology should be to provide support for the demonstration of cost-effective uses of distant learning systems, with an emphasis on the use of radio and including both in-school and out-of-school applications. In addition, support is needed for the development of local capacities in the less developed countries for the production of quality software for low-cost media techniques, such as tape-slide presentations or filmstrips.

ISTC could also help to alleviate the paucity of children's books and magazines about science and technology that are available to school children in the less developed countries. Most children have virtually no access to children's literature other than textbooks. A recent World Bank paper on education in India describes a study of a group of school teacher applicants: of the group questioned only 5% could think of a children's magazine and none could name a publisher of children's literature. (Heyneman, 1978, p. 14). ISTC could help to remedy this situation by supporting the development of a series of children's books or a magazine for young people focused on topics related to science and technology. Such publications could include information on applications of science and technology that are approp-

riate to the local situation, descriptions of the work of local scientists and technologists, and fictional stories about young people who are able to solve practical problems through the use of science and technology.

Recommendation 13. Fund pilot projects to encourage governments in the less developed countries to experiment with distant learning approaches such as the Stanford Radio Mathematics program, and provide collaborative assistance to help develop effective program sequences. Consideration should be given to the development of programs for use out of school as well as in school, and to the development of informative programs about science and technology as well as mathematics.

Recommendation 14. Provide support for programs to improve local capacities to develop quality software for use with low-cost media techniques, such as tape-slide or filmstrips. Topics which might receive special emphasis include descriptions of local applications of science and technology, scientific explanations of traditional technologies, and biographies of local scientists and technologists.

Recommendation 15. Support the development of a series of children's books or a magazine for young people in the less developed countries with an emphasis on science and technology. Such publications should be written by local scientists and educators, and could include explanations of scientific phenomena and local applications of technology as well as stories about children and adults who are acting in problem-solving roles. Several small books of this type have already been published as a part of the Science Library Series of the African Primary Science Program. The many "how to do it" booklets published in the United States for 4-H

clubs would provide a good model on which to base publications for secondary school students.

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APPENDIX G

COURTNEY NELOON
JUNE 1981

SMEC

The Science and Mathematics Education Center (SMEC) at the American University of Beirut is the product of a highly successful Foundation initiative in the Middle East.

SMEC is established and recognized. Its work has been professionally scrutinized by the Foundation twice in the past, and out-reach projects have been evaluated by others. Science and math education is a field the Foundation decided to abandon five or six years ago.

These factors call into question the value of an evaluation of the project at this time other than to satisfy a requirement for the graceful closing of the books. It seems to me the effort may be most useful if it concentrates on identifying the elements of foundation craft that permitted or assisted SMEC to succeed. For this purpose, I will briefly review the history of the project, pausing to dwell on issues where other choices might have been made.

Recommendations

Before reviewing the project, however, I wish to raise my principal conclusion which is that the Foundation has not quite finished its job. Before leaving SMEC, and perhaps the projects in Argentina, Brazil, Turkey and the Philippines as well, the Foundation should have considered ways to maintain the intellectional and operational vitality of the Center.

As will be described below, the Foundation did help SMEC define a regional role for itself by designing and financing projects in the Sudan and Jordan and by stimulating SMEC's large contract with Saudi Arabia. This entrepreneurial function is no longer performed by the Foundation, and SMEC does not seem to have acquired the ability to keep itself supplied with professionally rewarding service projects.

SMEC staff are trying to locate good opportunities. They were involved in negotiations with AID in Yemen for a project which eventually went to Eastern Michigan University. They visited UNESCO in Paris and called on ministries of education in the Gulf States. This month they will visit the Sudan where AID may be willing to support additional curricular development efforts.

One reason for their relative lack of success in landing new projects apparently was a misunderstanding of university policy regarding fees. SMEC staff told me that university policy requires them to charge $275 per day plus 75% overhead for any work they undertake outside the University. At $481 per day, their market becomes rather limited. This fee structure is based upon a major contract AUB has with Saudi Arabia for technical assistance in the agriculture field. Under this arrangement, the individual working on the project receives $200 per day and the university receives the rest.

Vice President Samir Thabet assured me that SMEC is not bound by this fee structure. Obviously, the personal remuneration involved, which was not included in the Foundation-financed projects nor in the Saudi contract, makes the higher fees more attractive. SMEC staff found themselves working in Saudi Arabia for no additional salary while the aggies were doing well for themselves. Nevertheless, SMEC staff indicated a willingness to engage in service projects on less lucrative terms and, now that they know the University has no objection, they may find more demand for their services.

I think it likely that the entrepreneurial problem goes beyond the question of fees, however. Designing a good project takes experience and a knack for meshing needs and resources which are not necessary skills for a good science educator. It also takes time and perseverance; SMEC staff have little spare time to devote to entrepreneurship given the press of other duties.

I recommend that the Foundation make an additional effort to keep SMEC vitally involved with the development of science and math education in the region by:

-- Co-sponsoring with AUB, on a shared-cost basis, a conference on the evolution of science and math education in the Arab World. Invitees might include representatives of funding organizations such as AID, UNESCO, the World Bank, and the Kuwait Foundation for Applied Science; representatives of ministries of education, and of other sources of expertise such as the center at Ain Shams, the education faculty of Yarmuk, and some of the Saudi universities.

-- Follow up this conference with a visit to those ministries and universities that express interest in further cooperation. An experienced Foundation education specialist, such as Champ Ward, Richard Krasno or David Smock, could travel with SMEC chairman George Za'rour and work out operational patterns for promising projects.

To maintain SMEC's intellectual vitality, I think it would be desirable to create a network of leading regional centers in science and math education such as SEPA in West Africa, IBECC in Brazil, the Science Education Project at the University of the Philippines (UPSEC) and others. These might be linked at least informally with one or two curriculum development centers in the US, such as the Lawrence Hall of Science or one of the Federal regional education centers.

This task of forging international networks might have appealed to the Foundation at one time, when interest in this aspect of education was high and funds were more plentiful, but I suspect it must now be left to others. I will discuss with Dr. Howard Minners, the Science Adviser at AID, the possibilities of networking support from his program. If the Foundation/AUB conference is held, AID might be encouraged to send observers from other regional centers. A session of the conference could be devoted to a discussion of what might be gained from the formation of an international network.

History of the Project

The roots of SMEC go back to a decision by Hugh Walker, the representative in Beirut, to work to improve science teaching in schools in the Arab countries. He invited Prof Milton Pella of the University of Wisconsin to survey the situation in 1962 and to suggest a course of action for the Foundation.

Pella found rote teaching by ill-prepared teachers, antiquated curricula, poor and unused laboratory equipment, and textbooks translated from European texts. He had the idea of establishing a regional science education center, but on examining individuals and facilities available in the region decided there existed no solid base on which to build.

Instead, he recommended that the Foundation appoint a program specialist in science education to the Beirut staff, build a program focus on science education at the University of Wisconsin, and train carefully selected graduate students from the Arab countries at Wisconsin.

Walker's domain did not include Egypt in those days. If it had, one wonders if the same course of action would have been followed. In the late 1970s, UNESCO took the lead in establishing a science education center at Ain Shams University in Cairo. Pella was a consultant on the project, supplied by the Foundation, and trained some of the center's staff.

Egypt considers itself the fount of education in the Arab world. Egyptian educators are found throughout the Gulf States and Saudi Arabia. They tend to belittle the educational pretensions of others, and SMEC staff report that their textbooks in Saudi Arabia are resisted by Egyptians there. In my opinion, strengthening the regional educational role of Lebanon, and AUB in particular, by locating SMEC there was healthy for Arab education and a sound decision. It is still too early to tell, however, how well SMEC will fare vis a vis the better funded Ain Shams center.

To return to the chronology, the Foundation made the requested grant to Wisconsin in 1963 in the amount of $141,000. That grant, supplemented by $57,000, is under evaluation by Jamal Manassah, and not part of this review, but under it, most of the key personnel of the future SMEC were trained.

Yacoub Namek and Wadi' Haddad were the first to be trained under the grant, and George Za'rour had already received his PhD under Pella's guidance and worked at AUB. The return of Namek and Haddad to AUB did not automatically lead to the creation of a center for science and mathematics education despite the strong interest of Pella and the Beirut office of the Foundation. AUB was in financial difficulty and reluctant to add to its recurrent obligations.

As an interim measure, the Foundation supported the efforts of the Ministry of Education in Lebanon to revise the science curriculum. Haddad served as a Foundation-supported consultant to a science advisory committee to Ministry, and

Walker followed the committee's recommendations by making a grant of $59,000 for summer in-service institutes for science and math teachers.

In 1969, the University was persuaded by the Foundation, and by Haddad's threatened departure, to receive a grant of $167,000 to create SMEC. This sort of Foundation engineering normally leads to an ineffectual project which disappears when the last Foundation dollar has been spent. That didn't happen in this case, but the decision to stick with AUB despite the greater interest in the activity on the part of the Ministry offers an opportunity to examine two related issues: the advisability of basing such a center in a university, and a foreign one at that, and the commitment of AUB to the perpetuation of SMEC.

On the appropriateness of AUB as a site, the present core staff of SMEC, Za'rour, Namek, Murad Jurdak and Rauf Eido, are unanimous. They strongly endorse the AUB base for a number of reasons. The university gives SMEC stature; the combination of teaching, research and service is synergistic; a base in any ministry would preclude regional activities; staff stability is high; and work can continue in isolation from political turmoil.

In contrast, the Center for Educational Research and Development (CERD) , created in the Ministry of Education in 1973 under Wadi' Haddad's leadership, had a brief flurry of productive activity and then became paralysed by the political situation. According to Eido, who once was on the CERD staff, even in normal times, three-fourths of one's time had to be devoted to non-professional work. All science-trained staff have left CERD; they normally lasted in the bureaucratic environment no more than two or three years.

The issue of AUB's commitment to SMEC is still alive, but in poor health. In the 1974 evaluation of SMEC by Pella, Delores Hernandez of UNESCO and Hisham Nashabi of the Makasset School system, AUB's lack of contribution to SMEC was one of the primary issues discussed. The report even recommended that SMEC seek another base if AUB was not more forthcoming in ensuring SMEC's stability and continuity.

At the present time, SMEC staff are still uncomfortable with the degree of commitment they receive from the university. In practice, however, the University has not inflicted the personnel cuts on SMEC that most other departments suffered, and the AUB leadership expresses strong commitment for SMEC as a permanent part of its program. SMEC still only has two academic lines in the education department, plus one-third of the Director's salary and the provision of one secretary and a lab attendant. Still, the expenditures from the AUB budget for SMEC rose from $11,000 in 1977-78 and 1978-79 to $29,000 in 1979-80.

Vice-president Thabet, who is administratively responsible for the Division of Education and Extension Programs of which SMEC is now a part, is unequivocal in stating AUB's commitment. Dr. Thabet considers SMEC to be a model project, one which serves AUB and the region well. He believes SMEC's service activities add a great deal to the quality of teaching in the education field by giving staff familiarity with the actual conditions of science teaching in the region. He said the University is prepared to maintain SMEC through lean years if necessary, but the financial condition of AUB would make an open-ended commitment unrealistic.

Given the pace of development in the region, and the precarious financial situation at AUB, I believe SMEC has all the commitment from the University it should expect. If it is unable to generate outside activities to maintain its vitality after one or two lean years, there is something amiss inside the Center.

Returning to the chronology, SMEC's service activities in the region began with the production of science textbooks and teachers manuals in English and French for each of the elementary and intermediate classes in Lebanon's public schools. This was a seven--year contract financed by the Government of Lebanon. Although the Bella/Hernandez/Nashabi team criticized the lack of formative evaluation phase before the writing of the books, they conceded that the product established new standards for textbooks in the Arab world.

SMEC next undertook a technical assistance role in the in-service teacher training project in Jordan in 1971-73. This was a massive program, financed by UNICEF, for up-grading the teachers of the country. SMEC's participation, along with that of the English Language Institute of the American University of Cairo, was financed by the Foundation by a grant of $172,000 to the Ministry of Education, of which $36,000 covered SMEC activities. This grant has been evaluated by Thomas Olson very favorably.

By 1972, when the Foundation's initial three-year grant expired, SMEC was already considered to be a regional education asset of some importance, particularly to the Foundation's program efforts. In that three years, the proportion of SMEC's operating costs borne by the Foundation dropped from nearly 100% to less than one half. That proportion has continued to decline to 35% in 1975-76, 22% in 1976-77 and under 5% since then. On September 5, 1972, a supplement of $198,000 was approved to AUB for SMEC for an additional three years.

SMEC's next service venture was to assist the Sudanese Ministry of Education with curricular revision, the production of pilot texts for various grades, and the training of senior ministry personnel in textbook production and evaluation. Grants totalling $127,145 were made by the Foundation to the Government of the Sudan for this activity.

This project was evaluated by Jamal Manassah and reviewed by Milton Pella in 1980. Manassah had a number of harsh comments to make on the conduct of the project but concluded that the long range strategy of building SMEC into a regional educational resource was well served by the project, and the Sudanese students have better textbooks as a result of it. He believes that some group in addition to SMEC should have been involved and that the Foundation's monitoring of the project was inadequate. Pella found most of Manassah's criticism misplaced and unrealistic, a view shared by Thomas Olson who monitored the project from Beirut. I concur with Pella and Olson.

In 1973, the Foundation arranged for an exploratory team from SMEC to visit Saudi Arabia to offer a seminar on SMEC capabilities and to examine possibilities for the future. Negotiations culminated in a major contract for SMEC in 1975 for the preparation of science textbooks for the secondary cycle. This work was expanded later to include math and science textbook preparation for the elementary and intermediate grades as well. In all, 41 textbooks and teachers guides have been produced for Saudi schools.

The contracts, totalling approximately $1.5 million, covered three phases of activity. In the fir st phase, SMEC undertook a field survey of problems and needs. They evaluated the old curriculum, solicited information on performances and problems from teachers and supervisors, and tested students emerging from the elementary and intermediate cycles.

They then drafted a new curriculum and submitted it for discussion to a seminar of Saudi ministry and university educators. The draft was then revised, and approved at a subsequent seminar.

Phase two was the preparation of textbooks and teachers guides for all grades. The nex books were introduced in grades 1, 4 and 7 the first year, grades 2, 5 and 8 the second year and 3, 6 and 9 the third.

Phase three involves the evaluation of the new curriculum and materials. Each set of books is evaluated two years after its introduction into the schools. This year, the first set of books is under evaluation. SMEC devised criterian reference tests at AUB to measure student performance and identify instructional weaknesses.

This project is the most complete effort at curricular development that SMEC has undertaken. Final returns on the project are not yet in. SMEC staff recognize some deficiencies in the implementation of the project. In particular, around 80% of the teachers in elementary schools in Saudi arabia are expatriates, mostly Egyptians, and they have not been prepared for the new materials. Typically they spend only two or three years in Saudi Arabia and then return home, so the Saudis do not feel preparatory training is warranted. In addition, the Ministry

has often been two or three years late in supplying the equipment designed to be used in conjunction with the texts.

The new math materials are somewhat controversial.. They call for activities by the students, but teachers are accustomed to giving monologues. Parents follow the progress of their children closely in Saudi Arabia, and many of them have difficulty in understanding the new methods. Generally, however, SMEC believes the ministry officials are well satisfied with the project.

Education departments in several of the new universities have been involved with the project through seminars and are likely to replace SMEC as the main source of curricular development expertise in the future. Some of them, including Jiddah, have indicated an interest in cooperation with SMEC, but this hasn't been followed up for fear of alienating Ministry officials. Here may be another missed opportunity for the evolution of SMEC activities.

The Saudi project has been so massive that its gradual decline over the next two years will leave a great gap in SMEC's operations.

Returning to the chronology, the last Ford Foundation grant was made in 1975 in the amount of $116,000 for a three year period. In practice, the funds will be fully expended only this year due to the curtailment of activities brought about by violence in lebanon. The grant was almost entirely allocated to research costs in order to protect the academic quality of the enterprise in the face of strong demands for development services.

During the course of SMEC's existence, the Foundation organized two comprehensive external assessments of its operations. The first, by Robert Maybury, was part of a review of five of the Foundations larger investments in science education.. It was published by Wiley and Sons in 1975 entitled "Technical Assistance and Innovation in Science Education." The second review, by Pella, Hernandez, and Nashabi, has already been mentioned.

This chronology, now concluded, has focused primarily on SMEC's service functions outside the University. This aspect of its mission is, I believe, of most interest to the Foundation as a development-oriented institution. Academic functions of teaching and research went on continuously, however, and SMEC staff have received a good level of academic recognition from their peers. They have helped to train more than 200 students, many of whom are in key positions in the Sudan, Jordan, Cyprus, Oman, Yemen and Pakistan.

SMEC staff have also been productive through research, although the majority of their publications are textbooks and teachers' guides. On important research project for which funding is to be sought from AID is a study of strategies of science and math education development in the Middle East,

based on their field experience. This is an important task which I would recommend the Foundation finance if AID funding is not forthcoming.

The major contribution of SMEC must be the new standards they have set for curriculum development and textbooks in the Middle East. No longer is it common practice to commission one or two cronies to write textbooks, mostly by plagarizing work in other languages. Now a professional process of defining goals, pre-testing materials and evaluating results is more the rule than the exception. Now it is common for PhDs to be involved in the writing of elementary textbooks.

Among the factors most responsible for the success of SMEC is the quality and continuity of the core staff. I believe that the fact that six of the core staff were trained at Wisconsin under the guidance of Professor Pella is an important ingrdient. Each of these scholars knows the standards of his profession, and knows his colleagues share those standards.. The addition of a French-trained science educator, Rauf Eido, has added valuable cross-fertilization but if all had come from different backgrounds I doubt the cohesion of the group would have been as firm.

Another unusual factor which I suspect had much to do with the project's success was the absense of expatriates in its creation. Frequently, a donor will set up a center using expatriate staff while local people are being trained to take over. The take-over is then delayed because the new trainees are found to lack the experience thought necessary to maintain the quality of the center. It is a tribute to Pella's judgment that this process wasn't followed with SMEC.

In conclusion, this is a project in which the Foundation can take pride. It is unlikely to be repeated by the Foundation because of dwindling resources and the emergence of new priorities, nor does it fit well within AID's New Directions mandate, but this kind of activity surely should be on the agenda of some major American institution. Had the Institute for Scientific and Technological Cooperation (ISTC) been realized, SMEC would have been a model for some of its capacity-building activities.