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The purpose of this conference was to assemble experts in economic planning and development to present, discuss, and assess the state of planning for economic development on both the domestic and international levels. Objectives were: to re-examine some of the important and practical methodologies and techniques for economic planning and development; to relate rural development problems of the developed world to those of the LDCs, particularly in Africa; to generate a clearer understanding of the factors to be considered in economic planning; and to exchange views of the Bureau of Economic Research and Development (BERD) and Virginia State's Research Staff with experts from other research institutions and organizations. The conference addresses give a broad overview of the development issues at the regional and the international levels. The papers are concentrated on specific issues and problems of development and planning relevant to the contemporary scene, and while not technical, they are aimed at both specialists and non-specialists. There are no general conclusions or recommendations.

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PROCEEDINGS AND PAPERS OF THE REGIONAL AND INTERNATIONAL ECONOMIC DEVELOPMENT PLANNING CONFERENCE

BUREAU OF ECONOMIC RESEARCH & DEVELOPMENT
BERD
Urban & Ecological
Marketing
Management
Production
Manpower
VIRGINIA STATE COLLEGE

VIRGINIA STATE COLLEGE
EDUCATION BUILDING
PETERSBURG, VIRGINIA

JULY 31—AUGUST 1, 1975

PROCEEDINGS AND PAPERS OF THE REGIONAL AND INTERNATIONAL ECONOMIC DEVELOPMENT PLANNING CONFERENCE OF THE BUREAU OF ECONOMIC RESEARCH AND DEVELOPMENT

VIRGINIA STATE COLLEGE

PETERSBURG, VIRGINIA

JULY 31–AUGUST 1, 1975

PROGRAM ARRANGED BY HUEY J. BATTLE

PAPERS EDITED BY CHARLES D. WHYTE

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FOREWORD

This Regional and International Economic Development and Planning Conference was held as a partial fulfillment of the objectives of the Bureau of Economic Research and Development (BERD) of Virginia State College. The objectives of the conference were to: (1) assess the current state of planning for economic development on both the regional and international levels; (2) reexamine some of the practical methodologies and techniques on economic planning and development; (3) relate domestic-rural-development problems to problems of less-developed countries, particularly in Africa; (4) generate a clearer understanding of the factors to be considered in economic planning; and (5) share up-to-date information on AID policies and programs with representatives on the local, state, national and international levels.

Moreover, the conference was held to further establish and maintain the close association that the six 211(d) agricultural economics grantees (Iowa State, Michigan State, Southern, Cornell, Minnesota and Virginia State) had developed since the 1973 Economic Development Conference held at Virginia State College. Institutions with international development interests were invited to attend in order to become acquainted with the activities of the agricultural economics 211(d) grantees.

This conference was made possible through the support from a 211(d) five year grant awarded Virginia State College in May 1972 by the Agency for International Development.

The Bureau of Economic Research and Development expresses sincere appreciation to those who appeared on the program and participated in the discussions. The Bureau is particularly grateful for the cooperation and encouragement from directors of 211(d) programs of other institutions. The contributions made by present and former officials of AID are evident as one reads these proceedings. The State of Virginia played an important role in the success of the conference for which Virginia State College is grateful. The presence of state agencies and representatives from other institutions of higher education within and outside the state of Virginia reflected their interest in the efforts of the Bureau. All segments of the college contributed significantly to the effectiveness of the program. Miss Betty Glass is especially thanked for her transcription and typing of these proceedings. Lastly, special thanks are extended to the BERD staff and particularly to Dr. Charles D. Whyte, Assistant Director and Co-Chairman of this conference for his untiring efforts that went into the conference. Dr. Whyte, has had the editorial responsibilities for these proceedings. Expressions of appreciation go to him for his patience in working with presentors of papers in preparation for this publication.

Since transcription and editing of some of the addresses may have been misinterpreted, the reader should contact the authors for validations or clarity if needed.

February, 1976

Huey J. Battle, Director
Bureau of Economic Research and Development
Virginia State College
Petersburg, Virginia 23803

REGIONAL AND INTERNATIONAL ECONOMIC DEVELOPMENT CONFERENCE

CONVENED BY: United State Agency For International Development, U.S. Department of State, Washington, D.C.; Virginia State College, Petersburg, Virginia; and Virginia State College–University of Science and Technology of Ghana–Linkage Program.

CONFERENCE COORDINATOR: Charles D. Whyte, Assistant Director, BERD/VSC.

CONFERENCE CHAIRMAN: H. J. Battle, Director of BERD/VSC.

THE FOLLOWING IS A LIST OF CHAIRPERSONS, DISCUSSANTS AND SUMMARISTS WHO PARTICIPATED IN THE CONFERENCE.

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Agricultural Economics
University of Minnesota
Minneapolis, Minnesota

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SUMMARISTS

Martin Abel–Planning For Agricultural Development.
(University of Minnesota)

Sidney Evans–Importance of Social Services in Economic Development.
(North Carolina A & T University)

J. B. Harris–Financing Economic Development: Planning and Promoting Development of Small Businesses.
(Virginia State College)

Anire Sagay–Institutional Building and Planning.
(Virginia Commonwealth University)

DISCUSSIONISTS

Donald Armfield–"The Importance of Cooperative Efforts in Providing Community Services."
(Virginia State College)

Winfrey Clark–"Development Planning and Virginia Planning District Concept: A Case Study."
(Virginia State College)

Ransford Palmer–"Comparative Dynamics and Development Policy Analysis."
(Howard University)

Richard Milk–"Planning Regional Development in Rural Areas."
(Virginia State College)

ORAL PRESENTATION

Samuel Butterfield
Associate Assistant Director
US-AID, Washington, D. C.

"What Is A Macro-Approach To Development"

EDITOR'S INTRODUCTION AND SUMMARY

This publication contains the addresses and the papers of The Regional and International Economic Development Planning Conference of The Bureau of Economic Research and Development (BERD), at Virginia State College. Financed by a US-AID 211(d) Grant under Title II of the Foreign Assistance Act of 1966, BERD's US-AID program was established to develop research and resource capabilities at Virginia State College for solving problems of rural development in Virginia as well as in Less Developed Countries (LDC's).

The purpose of the conference was to assemble experts in the field of Economic Planning and Development to present, discuss and assess the state of planning for economic development on both the domestic and international levels. The objectives were: to re-examine some of the important and practical methodologies and techniques for economic planning and development; to relate rural development problems of the developed world to those of LDC's, particularly in Africa; to generate a clearer understanding of the factors to be considered in economic planning; and to exchange views of the BERD and Virginia State's Research Staff with experts from other research institutions and organizations.

The conference addresses, particularly those of Benjamin Higgins and Roger Norton, give a broad overview of the development issues at the Regional and the International levels. The papers are concentrated on specific issues and problems of development and planning that are relevant to the contemporary scene. And while the papers are non-technical, they are aimed at both the specialists as well as the non-specialist. In all the papers, the reasoning and the conclusions are developed in a form both intelligible and useful to the specialists and informed to the non-specialists. The presentations are lucid and timely.

The majority of the papers are published without revision to the draft from which the presentation was made at the conference. Several, however, were revised after comments and suggestions were made before final drafts were accepted. All the papers published here are invited, not contributed, and are without constraint to length and content, except that they fit into the general frame of development and planning.

SUMMARY OF PAPERS

In the first paper, Rawle Farley argues that public intervention, by means of fiscal policy and other measures, are essential to ". . .help usher in revolutionary changes. . ." to meet the demand for development. In his paper "Fiscal Planning and Development: An Interpretation of Purposes, Constraints and Conflicts," Farley makes a most lucid and informative presentation of a few prominent and critical problem areas which fiscal policy confronts in a large part of the Third and of the Fourth Worlds. He identifies the drawbacks to the effectiveness of fiscal policy and, with sound theoretical reasoning and actual events, discusses the problems and solutions to them.

Cacho's paper contributes to the notion of a real resource approach to financing development. It is an attempt to bridge the gap between the current notion of the main objective of development activities in LDC's (i.e. growth rate) and the conceptual framework which determines these activities (i.e. tangible targets such as: amount of increase in yields and/or total production of each crop by region; and the increase in the number of functional literates, ect.) Cacho does not neglect investment as a requirement for achieving a satisfactory growth rate; but, is more concerned with what real resources are mobilizable to bring about social transformation in the shortest possible time.

W. W. McPherson discusses the importance of organizational and administrative capability in economic development with development planning in Pakistan as a source of reference. He attempts to answer the question: by what means is development planning suppose to contribute to economic de-

velopment and growth; He makes clear that planning is "development policy" placed in government where it will have a high status level and authority.

Brookins and Joshua, in their paper "Planning Economic Development and the Role of Institutions," attempt to analyze some specific functions institutions can fill in planning and development. They discuss the conventional versus the problem oriented planning and suggest that planning theories and techniques can be more useful once planners become more knowledgeable of the environments and the institutions within them. Brookins and Joshua make the point that conventional planning operates in a vacuum within disciplinary constraints; while problem oriented planning operates without regard to disciplinary boundaries.

Coutu describes research, as related to improvements in rural development policies and programs, on: (1) informational and methodological requirements for a national approach to estimating policy and program options; and (2) organizational requirements consistent with a national approach. The former focuses on a broader concept of rural development planning, including ways and means of evaluating growth centers, mobility incentives and political and economic consequences of programs concerned with concentrating scarce public developmental resources; and some means of developing a common sector and intersectoral methodology acceptable to various disciplines and regional considerations. The latter (2) focuses on means to overcome disciplinary dominance and to develop a truly interdisciplinary organizational structure which is required for improvements in rural development. Coutu suggests that: "growing committment of the need for policies and programs on population redistribution offers an opportunity for research—particularly more comprehensive development planning."

Tweeten's paper attempts to answer three questions on planning for development in rural areas: (1) in what geographic locations should job inflow or labor outflow be encouraged with public programs; (2) what level and mix of public programs alleviate poverty and underemployment at least public cost; (3) are economically efficient public programs for rural development consistent with goals and values of the people they are intended to serve; He examines cost-effective means (through public programs) of rural development; and makes a case for what he calls "...a vastly simplified yet more direct national growth policy than the existing *de facto* centralization policy." Tweeten recommends that underemployment be the criterion for focusing area activities to generate jobs; and suggests a comprehensive income maintenance program for the working poor. The means of financing such a program would include: a system of tax write-offs or direct grants to industry; a wage supplement; and labor mobility assistance programs.

Erven Long gives insights into the "Provision of Relevant Knowledge and Technology for Rural People." He begins with a look at the U. S. assistance to developing countries and attempts to answer the question of how U. S. and LDC's scarce resources can be allocated. He points out that a phenomena we need much better to understand is the process of farmer-to-farmer communication, and that, while we have learned that knowledge and technology must be tailored, adopted, tested and put to work within the developing countries, the cost of developing such knowledge and technology with the ability to transform the basic parameter is very high. "We must develop systems which find those basic things of sufficient generality that they need be done at only one or a few places at most, and do them there on behalf of the entire world."

William Hardy in his paper: "The Importance of Cooperative Efforts in Providing Community Services" examines the qualities of nonrivalness and non-excludability of a public good. He discusses the basic type of governmental unit and organization which is used to supply or administer public services and some of the associated problems. He further discusses the economic gains and improved public accessibility that can be realized through the imitation of cooperative efforts in providing certain services. He makes the point that regional cooperation for the provision of

community services could reduce costs and increase accessibility.

John Fischer, expouses an "Integrated Rural Development" approach for alleviating rural poverty in LDC's. It involves, among other things: people orientation as the key theme to planning; carrying out projects on an area basis; setting objectives in socioeconomic terms; and forming an agricultural productivity base.

James Lindley attempts to apply methodology, defined as a body of systematized knowledge concerning what is, to social services and development. He sees economic development as a function of savings, with the ability to invest, rather than consume. For social services to contribute to development, it must of necessity be of an investment nature. He uses birth control programs in LDC's as an example of social services as a positive investment.

Earl Heady illustrated by the use of programming models that it is possible to simultaneously analyse national, regional and interregional policies and possibilities in the development of a nation's agriculture. He contends that, while macro models have useful functions in development analyses and planning at the national level, they provide limited, and sometimes misleading, detail as the "what," "how," "where," and "when" to develop agriculture under limited and skilled manpower resources. As illustrations he uses two models: a Thailand model, and a U. S. model, with documentation of reports containing results for use by policy makers and the general public.

Rossmiller examines the problems associated with developing an analytical capacity (institution building) to provide input to the public decision making process affecting sector development in Korea. He uses the systems approach and simulation techniques to develop, test and apply computerized models of agricultural sector as an analytical tool for planning and policy formulation. The unique feature of Rossmiller's analytical capacity approach is that the ammassing, assimulating and analyzing of data are carried out within the "problematic logic framework," using a multidisciplinary approach and, in the process, developing indigenous resources.

Richard Day presents the recrusive programming model as an approach to fill the requirements for some development policy analyses. This model fills the gap between the principles of macroeconomic development and the practice of policy makers and administrators. It focuses on agriculture at the micro level and attempts to explain economic development as a disequilibrium process. The methodology begins with the proposition that economic development involves changing values, adjustment out of equilibrium, and a counterpoint of growth and decay that causes improving fortunes for some and declining fortunes for others. It continues with the proposition that the model builder's first objective is to develop an operational, mathematical representation of development that incorporates essential features of the process as it unfolds. Finally, its applications involve making conditional projections, comparative dynamic analysis and comparative static analyses.

William Serow reviews the trends in economic development in the Commonwealth of Virginia and assesses some of the implications of these trends for the future. He finds continuing urban expansion to be the pattern. Serow reviews changes in such indicators as education, unemployment and income as responsible for the changing pattern of residence. He focuses on the question of urbanization and on some of the potential costs and benefits of this urban development.

Batie and Smith report insights for alternative development plans from an economic development planning study on a regional basis in Virginia's West Piedmont Planning District. They illustrate how the planning district concept with imposed constraints pose formidable obstacles in achieving some planning goals, particularly those of economic development. They use an analysis of community resource development research to illustrate the inadequacies in the theories of economic development, and to overcome the obstacles using the planning district concept.

INTRODUCTORY REMARKS

BY

HUEY J. BATTLE*

We are indeed pleased with the kind of response we have received for this conference. In spite of the fact that this conference is held during a time when many of you are scheduled for a vacation, you have foregone such plans in order to be here. Certainly, we are grateful for this interest and cooperation. Your presence reflects the importance you place on the subject of Regional and International Development, particularly as economic planning relates to development. Inasmuch as we are focusing on rural development problems in LDC's, particularly in Africa, as well as less-developed or low-income sectors of this country, your presence also reflects your commitment to resolving problems of concern to the people residing in these areas.

It was April 19, 1973, that an Economic Development Converence was held at Virginia State College with the following objectives: (1) to increase the awareness in the State of Virginia of the international economic development issues; (2) to understand the mission of 211(d) programs and their potentials; and (3) to establish a basis for developing a closer tie among institutions with 211(d) programs. I am sure that those of you who were present at that conference can attest to the fact that considerable progress has been made toward achieving these objectives. As we look at the objectives of this conference, we feel confident that they too will be met during and following this conference.

As you can see from the program, we have two full days of activities before us. A few changes need to be made but they will be announced as we reach that part of the program.

We are indeed pleased that the directors of 211(d) programs, or their representatives, from the other five schools are present; also directors from other schools focusing on some aspect of development. I am looking forward to the vital information that will be imparted at this conference. Proceedings will be published and each of you in attendance will receive a copy as soon as they are printed.

Among persons interested in LDC's, low-income areas of the United States, and people who have been disadvantaged for one reason or another is the Interim President of Virginia State College, Dr. Walker H. Quarles. Dr. Quarles' many years of administrative experience in institutions of higher education have equipp d him with a feel for the problems and frustrations that plague those who have not quite achieved. Dr. Quarles came to Virginia State College some 23 years ago to join the late Robert P. Daniels, who was President at that time, with a clear commitment to reorganize and establish a program that would speak to the needs of the disadvantaged. Dr. Quarles has kept that commitment.

Although urgent matters at Virginia State College prevented him from going to Ghana this past January when a linkage agreement was signed between the two institutions, Dr. Quarles has demonstrated in numerous ways his willingness to accept the development program as a vital function of the school.

President Quarles, we have present, or expected to be present during this conference, representatives from four countries, twenty-eight states, thirty-six institutions of higher education, and a number of local, state and federal agencies. As you know, this conference is made possible through the support of the Agency for International Development, which is well represented. The Advisory Board of the Bureau of Economic Research and Development, and Cooperating Agencies are also represented.

It is indeed my pleasure to present Dr. Walker H. Quarles, Jr., Interim President of Virginia State College, who will bring you words of welcome.

*Director and Professor of Economics, Bureau of Economic Research and Development, Virginia State College.

WELCOME

BY

WALKER H. QUARLES, JR.*

Good morning friends. On behalf of Virginia State College Community, I am certainly happy to extend to you, the delegates to this conference a very warm and heart-felt welcome. During my first period as acting President of Virginia State College in 1968, the Bureau of Economic Research and Development was organized under the very capable leadership of Dr. Huey J. Battle and it became an important part of the college's program. It's major objective, to focus on the low income sector of society and to attain ways to enhance the welfare of that sector, has been of importance to the Commonwealth of Virginia.

It is now gone beyond the confines of the Commonwealth and those of the United States. It has reached into Ghana and the city of Kumasi, by it's close association with the University of Science and Technology. This conference, according to the program, will concern itself with the economic development of people wherever they may be. Your participants will discuss how the various sectors of the population throughout the world may better themselves through Agricultural and Economic Development. Through the effective uses of the social services within the communities and through the planning techniques used to improve the economic plight of all sectors of Virginia and it's environs. As you consider these most timely and note worthy topics, you will remember that the world itself, since 1946, has greatly shrunken.

The economic problems of America are also the same as economic problems in Africa, or the Far East, or the Near East or Europe. Poverty wherever it is, is merely intensified by ignorance; by a lack of knowledge in dealing with problems brought on by the simple idea of not having sufficient food to feed people, or clothes to cover their bodies, or houses to protect them adequately from the ravages of nature.

And so, I hope, as I know you do, that out of this conference will come major suggestions which will help solve some of our common national and international economic problems. Again, let me welcome all of you with the wish that only good can come from this body of great minds.

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*President, Virginia State College.

THE BERD'S OPERATION

BY

CHARLES D. WHYTE*

I am delighted to see the excellent attendance at our Regional and International Economic Development and Planning Conference, the calibre of speakers that we are fortunate to have, and the number of distinguished representatives from across the country, from overseas and from the State of Virginia itself.

Before describing the BERD'S operation, I would like to say a few words regarding the conference itself, how it was conceived and what we hope to achieve by it.

We established a Bi-Lateral Economic Linkage with the University of Science and Technology, Ghana, in January of this year. The focus of the linkage being Rural Economic Development, we desired to have the type of Conference that would give us greater insights into planning for development with emphasis on LDC's and to tie together the BERD's objective in Economic Development with the objectives of our 211(d) Grant Program, financed by the USAID. As such the main objectives of this Conference emerged as follows:

(1) to assess the current state of planning for economic development on both the regional and international levels.
(2) to examine some of the more important practical methodologies and techniques on economic planning for both regional and international development.
(3) to relate development problems in regions of the U. S. with problems in LDC's, particularly in Africa.

The papers that will be presented in the sessions today and tomorrow will be in line with these objectives. The first address that you will hear this morning will set the stage, so to speak, for economic planning and development at the regional level; and the second address will do likewise for economic planning and development at the international level.

With activities, both at the domestic and the international levels, BERD decided that a conference of this nature, as set forth in your program, would bring us up to date on the issues and problems in Economic Development and on the techniques and methodologies used in resolving these problems. Our Ghanaian colleagues and us at Virginia State College hope to gain greater insights into the problems and how to resolve them.

For our general audience, we hope the conference will provide an appreciation for economic development both domestically and internationally; and for our professional colleagues, we hope it will provide an opportunity for meaningful professional discourses.

The Bureau of Economic Research and Development, by comparison with research organizations found at our major universities and elsewhere, is quite small and only in its sixth year of operation, but, never-the-less, quite ambitious. It was formed in 1969 through funds from United State Department of Health, Education and Welfare. In 1970 BERD received a Manpower Grant from the U. S. Department of Labor and support, on a continuous basis, from the State of Virginia. In 1972 it received a USAID 211(d) Grant to develop institutional and research capabilities aimed at providing training and services in International Development.

It is multi-disciplinary in nature, encompassing the disciplines of: Economics, Agricultural Economics, Sociology,

*Assistant Director and Professor of Economics, Bureau of Economic Research and Development, Virginia State College.

Psychology, Business Administration Education and other disciplines as well. Beginning last academic year, BERD had a professional staff of ten, including Research Associates, Research Assistants, the Director and, myself, the Assistant Director. In addition we had about three part-time staff and five support staff.

The Bureau has an Advisory Board of twelve people who are not without influence in assisting with the implementation of our research findings; and who have demonstrated a keen interest in the solution of problems with which BERD is concerned. It also has cooperating agencies made up of Local and State Government and Academic Institutions.

The research of BERD is conducted in a seventeen county area of South Central Virginia, considered as our Laboratory Area. Our research projects to date have been concentrated mainly in the areas of Manpower, Management, Marketing and Production. There is, however, a fifth area in which BERD hopes to expand its activities with time—this being the area of Urban and Ecological Studies. BERD publishes a monograph series of its research findings, some of which are available at the information desk in the lobby.

The main focus of our current research has been to come to grips with the problems in our laboratory area. At the present time, we are engaged in conducting an overview study of the area, broken down into five categories:

Agricultural Production
Human Resources
Natural Resources and Government
Industrial Activities and Services, and
Marketing Structure and Activities.

In the Management area of our research, we are concerned with small business activities, small farmers and small businessmen. One project which is in the completion stage is the cataloguing of all available services. This, from a practical standpoint, serves as an information guidebook for small businesses. Also in the management area, since South Central Virginia is a peanut-tobacco producing area, with uncertainties in the Government Support Programs for these crops, we have a project designed to determine the optimum production mix for small farmers to maintain or increase their levels of income changes, should they be faced with a discontinuation of the government programs. We are also conducting a study on the role of lending institutions to small business.

In the area of Manpower, we have looked at Rural-Urban Labor Mobility, and Women Heads of Household in the Labor Market. These studies, and particularly studies that will be conducted after having identified problems from our overview projects, will be carried out with a view of telescoping methodologies to LDC's and in particular, to Ghana where we have our overseas operation in the making.

Tomorrow afternoon we are having a session on the VSC-UST Link Program in which we will discuss planned research activities. To mention briefly about our Bi-Lateral Linkage with The University of Science and Technology at Kumasi, Ghana. There are three aspects to it:

(1) exchange of staff
(2) exchange of students
(3) exchange of research methodologies and findings

The other activities of BERD Staff include: conferences such as this one, seminars, workshops and short courses in Economic Development. The BERD Staff teaches in the areas of Economics, Agricultural Economics and Sociology; and directs graduate theses at the masters level in Economics.

I hope that this brief description of the BERD's operation will give those of you who are not familiar with it some idea of its scope and mission. Our major objectives are to:

(1) maintain and enhance our posture as the top research center in predominantly Black Institutions in the United States;

(2) develop institutional and research capabilities and lend our skills to the various communities we serve, both internationally and nationally;

(3) develop a center of information concerning Economic, Social, and Community Development for South Central Virginia, the State of Virginia, and both local and national Governmental Agencies; and

(4) develop capabilities for implementing our research finding both nationally and internationally.

REGIONAL ECONOMIC DEVELOPMENT PLANNING

BY

BENJAMIN HIGGINS*

I'm sure everyone here knows that the "first development decade", as it has now come to be called, was a success in terms of average rates of overall growth in National income for developing countries as a group; and a dismal failure in terms of almost everthing else. Unemployment increased, the number of illiterate people increased, the number of mal-nourished and under-nourished people increased, health goals were not achieved and inequalities in incomes, wealth and welfare increased substantially. This experience has led to a considerable disillusionment with what might be called "traditional" approaches to development planning. By "tradition", in this context, I mean the 15 year old tradition that began around 1960.

There is a tendency now to disaggregate, rather than planning in terms of growth of National Income alone, and counting on growth to produce widespread and general improvements in welfare. The two main ways in which one can disaggregate are: (1) by sectors and, (2) in space. These often turn out to be much the same, because of the very large degree of over-lap between sectors and regions in the under-developed countries. There has been a great spurt of interest in planning for regional development, not as something apart from, but as an integral aspect of, national development planning. Virtually every developing country which is sharply regionalized, and even some countries which are not, are switching towards a regionalized pattern of preparation of national development plans.

Now, the simple truth is that we do not know much about regional planning, except in a physical sense, or in terms of development of particular industries, agricultural enterprises, or mining, where there are resources to develop. The one thing we have in the way of theory is the development pole/growth center theory, which says: if you have a region which is seriously retarded, it must lack a development pole. This was the essential idea of Francois Perroux, who observed that in the past development has not taken place at the same rate everywhere but, on the contrary, has tended to be concentrated in certain centers, particularly in urban centers and, above all, in large urban centers. He attributed this concentration to the presence in urban centers of "propulsive industries": dynamic, technologically advanced, innovating industries whose own growth was based on the capacity to innovate, rather than being a reaction to something which occured elsewhere in the economy. It was these propulsive industries, in the development poles, which generated the spread effects that brought wide-spread development: increases in income and employment, and hopefully improvements in welfare, in some larger region. For lack of anything better, economists have seized on the concept of development poles or growth centers, and today there is a large number of developing countries where national development plans are being prepared by starting from the urban structure, planning a system of development poles, growth centers, etc., in order to produce a certain pattern of regional development which will in turn add up to a satisfactory pattern of national economic development.

Let me say at the outset that I'm now convinced that development poles in the classic, early Perroux sense, seldom exist. If we mean by development pole an urban center luring or pushing some industrial and service activities into the city, and thus guaranteeing increases in income and employment *in the peripheral region*, then development poles are a rare phenomenon. I am moving toward a sort of "stage theory", with re-

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gard to development poles. Obviously, if 80 percent of the population is in agriculture and there is a market town in an agricultural region, there will be something like the classical or Christaller "central place", in which the urban center provides services and markets to the peripheral agricultural region which generates growth in the city, rather than the other way around. Then, in the course of economic development anywhere, there is structural change; and the relative role of agriculture in terms of employment shrinks, and the role of industries and services grows, thus bringing about urbanization. A point is reached sooner or later where the majority of the population lives in urban centers. If at that stage industry is formed which is based on exploitation of natural resources *in the peripheral region*, then the pure development pole theory works. That is to say, if there is a steel industry in the city of Estonia and the steel industry expands, exployment in the iron mines and the coal mines in the peripheral region will increase. If there is a pulp and paper town in the middle of the forest, and the pulp and paper plant expands the city will grow, income and employment will be generated in the forests of the peripheral region. It was this kind of experience which led to Francois Perroux's concept of the development pole, but it is a concept which belongs to a particular phase of economic history, a phase which was just ending in Europe when Perroux first presented his growth pole concept in 1950. It is not a theory that can be generalized for all times and places.

In the advanced countries, the propulsive industries are typically scientifically oriented, technologically advanced, and innovating. The ideal type is the multi- national, multi-product firm, selling brains essentially, capable of moving quickly from product to product and country to country with great skill. Obviously, with that kind of propulsive industry gathered in the development poles, there is virtually no relationship what-so-ever between the expansion of industrial activities in the city and income and employment in the peripheral region. Here Perroux's concept of "economic space" becomes more relevant. Perroux himself, particularly in his more recent writings, has stressed the fact that the economic ties of large metropolitan centers like Toky, London, Paris or New York are world wide in scope.

East Ontario is a stagnant, although not poor, region where the Ontarian government would like to move a lot of people. In a study of this region I was much surprised to find, first of all, that there were no economic ties among the small cities of the region. Secondly, and more striking, there were virtually no ties between the small industrial towns of the region and Ottawa, the capital city, which geographically should be the development pole for the region. Furthermore, there were only limited ties with the two metropolitan centers of Toronto and Montreal, which are Canada's major cities. These small cities of five, six, or ten thousand people, some with quite sophisticated enterprises, are buying equipment and raw materials all over the world and selling final products all over the world.

What use is it to say to the Malaysian government, for example, "Your true development pole is not Kuala Lumpus, (the capital city) but Tokyo, Bangkok, Sydney, London, Paris, or New York? Is the Malaysian government then going to put into it's budget large sums to invest in Tokyo, Bangkok, Sydney or London, in order to assure spread-effects in Malaysia Obviously not! When people talk about development poles or growth centers in a *policy* context, they are usually thinking of luring or pushing industries into some urban center, in order to have an impact *in the same region as that where the city is located.* That rarely happens. When it does, it happens only because the industries in the towns are buying raw materials or foodstuffs from the primary sector of the same region.

All this does not mean we have to give up the growth pole concept altogether, but it does mean that the job of promoting growth in retarded regions is more difficult than it seemed at first blush. I have been involved in Malaysia in two slightly different ways. The first mission was a large regional development project, about $4 million for a plan, the

execution of which will cost close to one billion dollars. This was an empty region, with about 60 thousand people, into which the Malaysian government wanted to move up to one million people (we recommended, finally immigration of 600,00 people). The region consisted of jungle which could be cleared, the tropical hard wood sold or processed, and something else planted instead. We had some guidance, of course, from the Malaysian government, in terms of policy statements, the New Economic Policy, the Second Plan, etc. The team interpreted the government objectives to mean that the government was interested in increasing employment and in raising per capita income; in protecting and improving the physical environment; and in improving the "quality of life", or the socio-cultural environment.In particular, the government was interested in reducing the economic and social gaps between Malays and non-Malays.

In Malaysia the Malay majority of population is relatively concentrated in agriculture; the minority-Chinese population is in the cities running the industries, banks and big commercial enterprises. This situation causes a great deal of friction. The government wants to reduce the economic and social gaps between Malays and non- Malays. This objective can be attained by reducing regional gaps, since the Malays are concentrated in certain agricultural states, and the Chinese are concentrated in the wealthier states, and particularly in the larger cities of the wealthier states. We expected that most of the immigrants into the region would be Malays. Therefore we insisted that it was useless, given the government's policy, to pursue a pattern of development which would guarantee, in effect, that the immigrants into the region would continue to be relatively poor. We argued that the pattern of development should from the beginning promise a level of per capita income equal to the national average, and provide for increases in family income at the same rate as the growth of national income, for the entire national economy.

As it turned out, the objectives which did most to shape the plan were these: (1) the insistence that people moving into the region should have a quality of life not inferior to the Malaysian average; and (2) that their incomes should start close to the national average and rise with the national average. These led to a revolution in the approach to regional development projects in Malaysia. Before that time the government had been moving people into villages of about 2,000 people, with virtually nothing in the way of health services, schools, or recreational facilities. Technically the new settlements were efficient. They were getting the same yields on their rubber, oil palm, and other crops as on the best of the private plantations, but the quality of life was miserable, and the population was trapped in a rural environment which in many ways was less attractive than the life of the villages from which the people came.

We persuaded the government that all the settlers of the region should live in cities of not less than 5,000 people, and preferably of 10,000 or 20,000 and up to a 100,000 people. Fortunately, we were able to prove that it was cheaper that way. Without increasing average commuting time between home and work, by providing free public transportation of some sort, (or even giving each worker a private motor scooter) we could save more money in the provision of health services, schools, recreational facilities, etc. than the transport would cost. We also persuaded the government that the size of land holding per family should be doubled, so as to guarantee s satisfactory level of living. All this led to a highly urbanized pattern of settlement. The government now has adopted this approach, not only for our region, but for all of the regional development programs in Malaysia.

Thus it was a pair of "non-economic" objectives, which would not have been regarded as respectable economic objectives 10 to 15 years ago, which really shaped the plan: the desire to reduce economic and social gaps between one sector of the population and another, and the desire to provide a "quality of life" which could be regarded as satisfactory.

This experience led also to a change in the whole approach to national development

planning in Malaysia, which was the concern of my second mission. The Third Plan was formulated in large measure in terms of the urban structure. The government wants to contain the growth of the capital city. They are aiming at a level of industrial employment and employment in the Kuala Lumpur-Port Klang area about 25 percent below what they think would occur in a free market. Penang, the second city, is doing well; it does not need incentives. Johore, despite the advantages of being just across from Singapore, at the Southern end of all transportation routes, with a deep water port, is nonetheless rather stagnant; it may need mild incentives. Then, on the retarded East Coast, with its heavy concentration of purely Malay population, some kind of incentives scheme is needed to lure new industrial activities. The city of Kuantan in particular shows signs of becoming a true growth center. Kuantan is now a city of about 75,000 people, but it could easily quadruple in size in 20 years, given the current rates of growth. But even such growth will not solve the problems of the two really poor states of Kalantan and Trengganu further North. There is little reason to expect generation of spread effects from Kuantan throughout the whole North-eastern region. Industrial growth of Kuantan will no doubt attract some people from the poorer agricultural area into industrial jobs. That will help, by reducing population pressure in agriculture, rather than through a process of generating income and employment from the city to the region. Perhaps some of the industries will be of a kind which will process raw materials produced nearby, but these are more likely to benefit the newly settled development areas to the south than the retarded states to the north.

In Haiti the Canadian aid agency (CIDA) was given it's choice of six regions for an integrated development program. Haiti is roughly crescent shaped; the region chosen begins 50 miles West of the capital city, Port-au-Prince, and runs about 100 miles along the coast and some 50 miles inland. It is a region with no surfaced roads, no roads of any kind which are passable at all times of the year. No city has electricity 24 hours a day except Miragoane, where the Reynolds Mining Company is providing electricity to the town. The hospital in the little regional capital of Petit Goave, which is supposed to serve 600,000 people, has one doctor, two professional nurses and four or five paramedical personnel. The nutritional shortfall is something like 50%; virtually the whole population is mal-nourished or under-nourished. Infant mortality rates are 30 percent. People are equally poor in Mauritania or Bangladesh, but at least in those countries there is some kind of infra-structure; there are roads, railroads, airports, etc.; in Haiti, it is not a great exaggeration to say there is nothing. There is hardly even a government in the normal sense of the term.

Our project in Haiti is unique (in my experience, anyway) in the sense that the team is involved not only in preparing a plan but also in executing the plan. A planner does not often have the chance to stay around and see projects actually carried out. Moreover, because CIDA (unlike AID) is eager to spend it's ever-expanding budget, we are being pushed really hard to empty the cash box before the fiscal year is over. Consequently we are starting to execute projects before the planning is done, or before the studies are complete. Accordingly we seek to "minimize risk". Minimizing risk in this sense means choosing projects for each quarterly batch which could not be proved ill-chosen by anything new we might learn later on. That is not quite so, as hard as it may sound, in a country like Haiti, where *everything* needs to be done.

We have less guidance from the central government than is normally the case. However, there are some guidelines. The Haitian government wants to restrict the growth of the capital city, and with justice, because Port-au-Prince has no space, and severe shortages of water, electricity, sanitation, housing, schools and hospitals. It is simple incapable of handling the influx of rural population that has taken place in recent years. One of our objectives therefore is to hold most of the natural population growth in our own region, if possible outside of agriculture. Most families have less than one carreau (2.3 acrea)

about the same as in Java; but Haiti is not Java, with its volcanically renewed soil and well regulated rainfall. (Allah does a better job for Java than God does for Haiti in that respect). In Haiti 2.3 acreas per family is very little. For the evaluation of projects, we have set up a "welfare" or "objective function" with improvements in nutrition as the number one objective, followed by public health and education in the broadest sense of the term (including adult literacy, since some 90 percent of the population is illiterate); family income, in the sense of value of production per family; the physical environment (erosion is a serious problem and arable land is being reduced each year); and once again "quality of life", which is a bit harder to quantify in the Haitian case than in the Malaysian case.

For the first two years of the four year program we are recommending projects which will contribute to nutrition, health, education, and family income. In the second phase we will concentrate more on projects which will raise family output directly. It is much easier to provide aid in form of health services or "food for work" programs, than it is to bring direct increases in output, either by raising agriculture yields or by providing industrial and service jobs. Our objective is to bring an immediate improvement in welfare, particularly in the form of nutrituion, health and education. And by the end of the first phase, four or five years from now we hope to have raised the value of output per family to the level of disposable income per family, of which Canadian transfer payments will be a substantial part during the early years.

These two little tales from my own experience, should indicate to you how far planning practice has moved from the planning of the textbooks of 10 years ago. Even in the 2nd edition of my own book on Economic Development, you will find that planning is still discussed in terms of setting up targets for growth of national income, calculating capital: output ratios to estimate the investment requirement, and dividing up the investment requirements among sectors on a basis of an input; output analysis estimating the "two gaps", etc. You will notice that the process of planning which I described in Malaysia and Haiti has virtually nothing to do with all that.

Among the other things I have been involved in lately is the so-called Unified Approach Team of the United Nations. That term really means an integrated approach, and is called for in a United Nation's General Assembly Resolution. The research was entrusted to UNRISD, the United Nation's Research Institute for Social Development. The general idea is simple enough: if we want to improve "welfare," defined however a particular society wishes to define it (but certainly including some minimal improvements in health and education, some reductions in inequality of income, of which reduction of regional disparities may be a part) then it is necessary to plan directly and simultaneously for the whole set of objectives. More important, it is necessary to take into account all the interactions among them. Improved nutrition increases the yield on investments in education; it increases the yield on investments in public health; improved public health increases the yield on education as well. In a region like ours in Haiti, the systems of roads that we are planning will not raise output very much, but it will raise health and education. Everything depends on everything else. We are confronted with a feed-back system, and a rather difficult one at that. Planning must be undertaken in terms of this feed-back system, if it is to be effective.

So far as urban and regional planning is concerned, the main conclusion is much the same. The growth centre/development pole concept still belongs to an era of free market economy. If we find a retarded region, well, we should try to create a growth center, which means simply putting some industries in the city and then letting the market do the rest. Even Francois Perroux himself no longer believes that this simple approach will work. He now speaks of the danger of creating conglomerations of activities which may make things worst in the rest of the country rather than better—the development of poles rather than creation of development poles. We must plan in terms of the whole system, building not only generators but also transmission lines

and powerful reactors. This is easily said in terms of such an electrical analogy, but not so easily done in terms of the actual design of urban and regional development projects. Essentially it means planning in terms of systems of cities and trying to create linkages among them where they do not exist, filling in gaps in the system, rather than having a naive trust in the capability of "growth ceters" as such to solve problems of larger regions.

INTERNATIONAL ECONOMIC DEVELOPMENT PLANNING

BY

ROGER D. NORTON*

International development planning is something very hard to define in actuality. I suspect there are at least two constructive ways to look at it: one is the set of approaches to development planning as practiced in international institutions; and the other might be the system of national-level building blocks which, while they are not linked together, certainly are the component parts of the coherent and international effort to plan, direct or assist in furthering development.

It just happens that recently I have been making a casual survey of a number of international institutions, in terms of their attitudes to and techniques of development planning, particularly in the fields of agriculture and economy-wide planning. There is a rather surprising amount of commonality in the approaches. to be specific, I am speaking informally of some of the work in the World Bank, the ILO (International Labor Office, in Geneva), the U.N. Food and Agriculture Organization in Rome, and tne Economic Commission for Europe and I think I can even speak to some extent for USAID, although I am sure I will be corrected when the questions and comments come from this audience.

There is a commonality both in attitudes to and techniques of planning, and in both cases a significant evolution has taken place in the last five years, even in the last two or three years. Policy planning as it is practiced now, or attempted to be practiced, is really quite different than it was in the 1960's. And since the evolution is so rapid at this moment, it is hard to see where we are going; five years from now it may be different yet. So what I am going to try to do is to give you, in a totally informal manner, an up-to-date summary of developments as one person has seen them in a variety of places.

Historically, development planning methods have arisen out of a combination of research and experience. And when they have been useful, of course, it's been attributed to experience, to the practical wisdom of people who use planning techniques. This is by and large appropriate. I think we have to be quite frank that economists cannot speak terribly confidently yet about the practical fruits of their development research. Certainly not as confidently as the people involved, for example, in technical agronomic research where a number of very promising and, in fact, very beneficial break-throughs have taken place toward alleviating world hunger. Humility is rather important in the application of technical tools to urgent practical problems. This is especially so when one gets involved in complicated planning models which tend to take on a certain sanctity of their own. The formal contribution to planning of research-based methodologies has really been not so much a direct guide to setting policies but more an educational contribution. It has been a reminder to policy makers and anyone involved in international development to think of things in a consistent framework and to try to take into account all competing effects and all complementary

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effects. These are, of course, somewhat trite statements but unless there is a formal framework as a continuous reminder to look at consistency aspects of the problem in front of you, and in particular to point out which aspects are the most important, sometimes they are overlooked. So there has indeed been a net contribution of formal planning techniques, but on the whole a rather indirect one.

As I mentioned earlier, planning techniques are themselves in a state of evolution, and there is a trend toward bringing them to bear on more specific issues. In fact, the pendulum has swung almost to the micro extreme, in terms of using formal analysis to provide the policy maker with specific quantitative assessments of a large number of concrete options. As a profession, we're moving from a stage of indirect, pedagogical use of models to considerably more direct uses. Of course, that's a stage which is frought with danger. So let me summarize what appear to be some current attitudes about the ways in which planning techniques can be best utilized.

One area where a consensus comes through quite clearly -and I would welcome disagreement on this point- is that sector planning has been far more useful than economy-wide development planning per se, seen in terms of an attempt to make a formal planning program which furthers national development goals. Now, why is this? There may be a number of reasons why this has proven to be the case. For the data being analyzed are much more specific at the sector-level. One is dealing with yields per hectare and amount of irrigation per hectare and things like that, instead of parameters like elasticities of capital-labor substitution. And when the data are that specific, it's much easier to incorporate judgment. If you don't really know what the corn yield per hectare is in a certain region of rural Mexico, you can go find out, or you can ask an agronomist. But if you don't know what the elasticity of capital-labor substitution is, it's very hard to find someone to ask.

Another appeal of sector planning is that there is greater specificity of policies, not only of data. For example, the policy instruments may be particularly input prices and output prices: prices of electricity, prices of oil, the prices of fertilizer. In other cases they may be exact allocations of factors: allocations of water by crop in some cases, allocations of cement capacity in others, and so on. Again, on the national level it's very hard to put your finger on such specific instruments. Of course, there's the hallowed triad of the exchange rate, the interest rate, and the wage rate. But how many governments actually set the wage rate? How many governments wish to move the exchange rate? Or when they do, it's not likely to be on the advice of planners but rather in response to an exchange crisis.

Effectively this means that in the planning process at the sector level there is better interaction with the specialists: the agronomists, the engineers, and other kinds of field workers. There's also better interaction with the policy maker because the planner is talking about things that have direct meaning to him. Thus it's not surprising that in the last few years, we've seen much more emphasis on sector-level policy planning methods. And, as you've probably guessed from these remarks, I think agriculture is an area where sector planning can be quite useful, perhaps more so than in other sectors. This is true for a number of reasons. Certainly, agriculture is the sector that typifies both the problems and the prospects for development. Second, there usually is an extensive array of policy instruments available for influencing agriculture, in most cases far too many, because they tend to be competing and conflicting.

To look at it a different way, in agriculture there's a greater "policy separation" between the investment project decision and measures addressed to the sector as a whole. In the steel industry in developing countries, the "sector plan" often is really a project planning problem for one or two large-scale projects. The same may be said of fertilizer and chemicals in many cases. In agriculture, there are typically thousands of small-scale investments occurring every year. But there's also a whole set of other complex problems superimposed on the investment decisions, including, of course, the overall investment

budget and its financing but also including the setting of prices for food crops, import tariffs, the price of fertilizer, the interest rate on short-term credit, etc. In effect, for decision analysis in agriculture there is a distinct layer between the project level and the national level, in terms of both the problems and the instruments available to address them.

Now let's look at national (or economy-wide) planning for a moment. We've mentioned the lack of specificity and the difficulties of coming to grips with specific policy instruments A partial answer to these criticisms which is being evolved in some institutions is to in fact make macro planning models much more specific to put micro data into them–to put engineering data directly into macro models. In other words, a model doesn't have to be based entirely upon econometric estimates of parameter values. It can include engineering data, agronomic data, and so on. To make it a macro model, it has to come out with macro conclusions. It has to tell us something about the trade-off between employment and foreign exchange earnings at the margin. But it can be based on rather more specific inputs. And therefore, it can be directly checked on the input side; and it's much easier to put identifiable policy instruments in models if this kind of specificity is built in the structure.

Another evolution in macro planning techniques is to be much more concerned about what I would call policy instrument feasibility or policy feasibility. And of course, this is another reflection of the pragmatic concern for implementation of plans. In the late 1950's and 1960's it was fashionable in academic circles to make optimizing models of development which would, of course, derive optimal development programs by definition, and which also might imply some very strange policies if they were to be achieved at all. It might imply things like quadrupling the tax rate if anybody looked carefully at the program or change in a foreign exchange rate by a factor or two or three. Things like this simply didn't enter the model explicitly but might be implied or necessary in order to fulfill the program, to put it into practice. I think it's becoming much less fashionable to make this kind of model and people are much more concerned with putting the instruments in the model to begin with, and to say that we have limitations on the amount that we can change them. This characteristic has appeared in recent models for Europe as well as for developing countries. So we may yet come to a phase when the typical Minister of Finance will find a macro model a little more useful than he has in the past, but for the moment I think the balance is clearly in favor of sector models.

Let us talk for a moment about the ways in which models are used. Fruitful application of models frequently involves some degree of research; the two go hand-in-hand. There never is a definitive answer or a definitive solution. There is the exploration of many ideas, the exploration of many different numerical values for parameters that we do not know exactly. This is absolutely essential if the model is to be at all helpful to the policy maker.

Some economists speak of "data alternatives" and "policy alternatives"; we like to run the model under different assumptions about what the numbers might be, simply because we do not know them with much certainty; and we like to run the model under different assumptions as to what policies might be (or limitations on policies might be), to try to find out the likely implications for the variables of ultimate concern, such as employment and income distribution. We find ourselves in a situation of having very imperfect data, and that will always be the case, I would venture to say. Therefore, the purpose of the model is not to give us exact answers, but to derive some of the logic inherent in the data. It is necessary to do the best we can with the existing data set, because the policy maker has to anyway. With or without a model he has to make his judgments about what might happen if his policies were implemented. The model is constructed to assist him in that process; and the best way we can improve the data is simply to run the model under different values and to find out how important it would be if those numbers were different. It may turn out that some numbers are not terribly important in terms

of the macro-economic results, even if they are wrong by twenty or thirty percent. On the other hand, we may find that some parameters have a markedly different impact if they vary by as little as five percent. In the second phase the data improvement efforts are directed at those critical numbers.

Just to cite a small personal example, I was involved in a study in Mexico where we thought we had pretty good data on irrigation. The model contained watering coefficients, by crop, by month, by region, and by localities. In the preliminary solutions, it turned out that there was a total lack of consistency: either the watering coefficients, as reported by the engineers, were wrong, or the estimated amount of water available was wrong. This result set in motion a process of three or four months' work in which the engineers went back to the fields and checked out their numbers and, in fact, published a new set of data on watering practices in Mexico. That is a common experience with models, if only a minor one. The Mexican Ministry of Water Resources happens to be a good organization in terms of technical staff, so it is not a problem that is peculiarly theirs. But this illustrates the value of the model's consistency requirements.

The model makes it necessary to ask these questions, so it can be used as a giant adding machine. You can get monthly employment figures out of it, if you have monthly farm budgets to go into it, even though there are not any published monthly employment figures for the sector. It is possible to learn a fair amount about the sector by using the model as a giant adding machine. Again in Mexico the model served a useful role of providing an orderly framework for our sector data, however imperfect they were at any point in time.

Here is another example of using a model without solving it. It concerns the man in the Mexican Ministry of the Presidency who had sponsored most of this work. On short notice he had a meeting with the President on an agricultural crisis in North Western Mexico, about how much acreage to switch between soybeans and competing crops to reduce ballooning imports. He said: "Look, I have to go there this afternoon and there isn't time to make a special solution of the model, so just give me your numbers about growing soybeans and growing wheat in these North Western areas, showing the amounts of employment per hectare, fertilizer per ton of output, etc." He took those to the President with a slide rule and on the spot he was able to make statements about the net employment effects and the net additional cost in terms of bank credit and other inputs of switching 100.000 hectares of soybeans to wheat. If he had been terribly familiar with farm budgets studies, he could have done that without the model's coefficients, but as a national planner he was not. So the model summarized these farm budget studies for him and gave him a ready tool, a ready set of consistent data that he could use in a very ad hoc manner. So when we talk about uses of models, I think we have to first talk about these simple, trivial but important consistency uses.

The last point is that to make a model more useful, through repeated solutions it is mandatory to have an adequate electronic computing system. And that, I realize, rules out planning models in some circumstances but they probably should be ruled out in those circumstances. To make the model useful, it is necessary to organize and process fairly large amounts of data, and getting meaningful results requires making many solutions. The user cannot be deluded by any one solution; you have to keep testing it. So the model is really a numerical system embedded in a computer in one sense, although it is a tool for interacting with the policy maker in another sense. There is really no short-cut to this; there is no substitute for what we could call an adequate soft-ware system.

We have found increasingly that the computer itself, the hardware, is not the bottleneck, but the problems lie in systems for using the computer and in writing programs that are intelligible to those who are not computer specialists. Now, I am not a computer specialist myself and I tend to get lost in the data and I make all sorts of errors

when setting up the model by hand. I have found it essential to work with skilled computer analysts who can define the model inputs in terms that I understand as an economist. They also assist my understanding of the model structure, and they define the model output as I or a policy maker would understand it, in terms of policies and impact variables such as employment. I do not want to have to worry about the process of obtaining a solution if I am interested in economic policies. Therefore, model work is team work among individuals of different skills. A model is a system in many senses.

Let me move on to economic techniques of constructing planning models for a few moments. First, it should be understood that models are warranted only in those instances where the interacting real-world effects are too many and too complex to handle with simple calculations or intuition. In Mexico, for example, the corn price support level always is a terribly important issue. And the policy makers want to know by how much they might have to increase the price to get a given additional amount of corn. That is one type of question. They also want to know what happens to total employment when other crops are declining in production to allow for the additional corn. Would they be export crops? What would happen to not only wheat and soybeans, which can compete directly with corn, but what would happen to sugar cane, etc? Put in those terms, the problem becomes a little too complicated for the back of an envelope. One of the few cases where I saw a model being directly useful was the case in Mexico where we were able to give rough estimates at least some of those trade-offs.

This kind of result can be obtained from a model which is basically constructed with micro-data. Farm budget studies and engineering data are fed directly into these models. The models are also to reflect basic economic principles of supply and demand. What is produced has to be marketed even if it is for home consumption. So in imposing our consistency requirements, we go back to supply and demand and we equate them relentlessly.

For every product, for every input, for every factor, we ask what is suppl and what is demand. Now supply may be characterized by a complicated production function which describes how corn is grown. On the other hand it may be given by a few data from cropping calendars from sample farms. The current viewpoint is that we do not particularly care how production is described: we are willing to accept agronomists' judgments, and we are willing to accept an econometrician's production functions. We are not bound by any mathematical technique. We can accept any description of supply behavior as long as it makes sense. The same thing goes for demand. What are the components of demand? Regional demands? National demands? What is home consumption demand? What is international export demand? Let us put them all in the model because they have to be there to be consistent, to enable the model to contain an overall accounting framework.

There are three key concepts; supply, demand and equilibrium. What kind of equilibrium is it? In other words, what kind of market is it? Is it a monopolistic market which is controlled by a few vegetable producers? Is it a competitive market where every farmer is at the mercy of the market prices? Is it a distorted market? Distorted by government inventions? Distorted by local monopolies in trade and transport? Distorted by attitudes towards risk, climatic variations, etc? What are those distortions? Most of them can be put in a model. In other words, let us be terribly pragmatic about it and start from a description of reality as it is, and in a step-by-step manner simulate with the model the consequences of changes in that reality.

In summary, the "new style" of models allows for pragmatism in use of data from different sources and in characterizing the initial reality—the point of departure. But they require conceptual clarity and absolute consistency in an accounting sense, and precision in design of computing procedures.

Now what are some of the limitations of these models? One of the primary limitations, of course, is in the treatment of dynamics. Development is a dynamic process. One

manifestation of that is the rate of adoption of new techniques by farmers, that is, how quickly they adopt new techniques or how quickly techniques are diffused through a given farming area. And that is a terribly difficult question to analyze. It is difficult partly because of the influence of social factors—how much farmers cooperate or not, the adequacy of the banking system, and so on. These factors are very hard to know with precision. We may make numerical estimates of how rapidly ideas and techniques were diffused in the past, but we cannot predict them very well. These are the kinds of questions to which we should say: let us be realistic, we cannot really handle them with a model.

We could, however, adopt the following procedure. We could alternately suppose that 20 percent and 50 percent of the farmers in the area adopted the new variety within two years. Then the model could be used to find out what the difference in these rates of progress would be in terms of the income distribution in the area, and in terms of employment and total production. In this way we might find out how important it is to put a great deal of emphasis on extension services to speed up the diffusion program, but we cannot make confident forecast about the dynamic processes themselves. We must be careful not to delude ourselves that we understand the dynamics, because often that is really the human side of development. We may try to assess the possible consequences of an hypothetical situation, and leave it to the policy maker, who knows best, to decide whether he can in fact achieve that hypothetical situation.

Well, all this has been about sector models. As I said, I think I see some of these ideas evolving in macro-models and I will not talk about them in particular today except to say that the World Bank is now, along with many other institutions, putting emphasis on new macroeconomic frameworks of analysis. I think it is fair to say that in the past, the macro-models of development were focussed heavily on issues of debt and foreign trade. The new generation of macro-models is based on a recognition that that is not adequate. Certainly it is not adequate for carrying out a full dialogue between international institutions and for carrying out a full dialogue between international institutions and the developing countries themselves. We need to know more about the impacts of lending programs on employment, income distribution and other variables which have social implications. The new models are beginning to incorporate some of these factors, still in a very experimental way. We do not have the successful applications of them yet. We are also trying to incorporate prices, which, again, is something familiar to sector planning people. Most policy instruments directly or indirectly work through prices. After all, a tariff is a price and an interest rate is a price. Some of these new characteristics of models were pioneered in Europe, about 15 years ago, and they are being refined and used in studies commissioned by European governments. Time will tell if these features of models can be made simple enough to use. The new models unfortunately are larger, because they have a lot of detail. So again, computer systems are the key to widespread application.

In conclusion, I do not think the issues have changed in development: they have been the same for quite some time in general terms at least. But now, in terms of analytical techniques, we are entering a phase where we are trying not to be bound by mathematics or by computing. We are trying to achieve flexibility in specification and openness toward data of different types, in order to bring the analysis down to a more realistic level of detail. Only time will tell whether this new approach can succeed in bringing macro models out of the classroom and into the world of the decision-maker.

CHANGED WORLDS AND NEW AID DIRECTIONS

BY

SAMUEL C. ADAMS, JR.*

Two years ago I was honored to be here at Virginia State College to speak at a conference similar to this one. Then we talked about A.I.D. Africa Bureau concern with:

(1) the impact of possible long-term environmental change for the severely drought-afflicted areas like West Africa's Sahel;

(2) the potential application of advanced science and technology, such as remote sensing and satellite imagery, for furthering development of the very poorest countries; and

(3) the critical need to make development occur in ways meaningful to people, and that they themselves be participants in the development process.

When we talked two years age, there was a deep questioning of results obtained from past efforts at enhancing capabilities of the farmers, the herders, the merchants in African development. The efficacy of past technical assistance efforts might have been much greater had we known better how to tap into an understanding of the variety of decisions people make or to draw upon the wisdom of their adaptive genius in combination with whatever elements of knowledge and assistance we had to offer.

Today, these aforementioned issues of environmental change and drought, the role of science and technology in development, and problems of the sociology of development are still relevant. But how unprecedented have been world changes since I spoke here two years ago!

The food crisis extends beyond isolated areas of drought. Risks of world famine prompted particular international concern over food production, prices, and distribution. Certain members of the Congress seek to provide new and enlarged sources of funding for agricultural research both here and abroad.

The energy crisis has prompted unprecedented changes in views everywhere about the suitability of the current ordering of relationships between the world's economic structures. It has ushered in a great debate over the world's economic order.

Clearly, if not new, a much different international economic order now exists. New terms have become part of our vocabulary reflecting new perceptions of the developing world. Aid giving agencies are afresh focusing on the poor majority, the small farmer, equity or the income distribution effects of aid.

There is now a Third World of mineral-rich developing countries. Nigeria, Gabon, etal, for example, would now be aided by the U.S. under reimbursable costs arrangements instead of concessional loans or grants. At the other end of the spectrum are the 41 "MSAs"–the developing countries "most seriously affected" by the petroleum crisis–a new category of special need. Countries among the 25 "Last Developed" which had concerned us earlier are especially hard hit.

Furthermore, despite, for example, the progress LDC nations felt they achieved in the Rome agreement, over the earlier Yaounde agreements, there continues to be both a trend toward polarization and politicalization of developing country-industrialized country differences. Witness the developments in the United Nations.

Finally, for the United States-LDC relationships, events in Indo-China made necessary a major readjustment of national thinking. Heretofore, Vietnam, Cambodia, and Laos consumed fully a third of our annual program. With the ending of U.S. programs in Vietnam, Cambodia and Laos, not only did

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A.I.D. staffs become redundant, for the first time in fifteen years, the request to Congress for foreign aid did not have this security-related aspect of our program any longer as a major ingredient.

Development progress is of greater importance to the world today than yesterday. The interdependence of the developed and developing world, as evidenced by the energy and food crises, makes development an even more critical ingredient in a peaceful world order. But what are the trade-off diverse publics may choose between foreign aid and domestic concerns, with inflation and unemployment? How feasible or real are American expectations that oil-rich countries ought to take up, as there will be need, more of the burdens of capital transfer to less fortunate nations?

Today, I propose to discuss the evolution of U.S. aid policies and programs, and some of the questions that this conference might ponder in light of CHANGED WORLDS AND NEW AID DIRECTIONS.

I

The A.I.D. program has itself changed very significantly in the past three years. Indeed, perhaps few outside of A.I.D. and the Congress recognize the degree and significance of that change. The basis of that change is the FY 1973 Foreign Assistance Act. The Act channels aid funds almost exclusively into three categories: food and nutrition; education and human resources; and health and population. Even in these categories,the emphasis is not on capital transfers. Much less funds are now available for physical infrastructure like roads, telecommunications, electric power, or for general economic support.

The changed A.I.D. program has resulted in the following budget allocation picture:

(1) In FY 1973, $220 million of the A.I.D. program worldwide went for physical infrastructure; for FY 1976, only $47 million is proposed. In FY 1973, over half of the A.I.D. program in Africa was in transportation and other infrastructure; in FY 1976 less than 5% is proposed for this purpose.

(2) Previously, program loans, i.e. general development support loans, accounted for a major part of A.I.D.'s resource transfers, especially to countries like India, Pakistan, Brazil, Korea, and–in Africa–Morocco, Tunisia, and Kenya. In FY 1976 no program loans were made and none were proposed for FY 1976.

(3) In sum, by FY 1975, 8% of A.I.D.'s funds were channeled into the three categories highlighted in the 1973 Act; for FY 1976 the concentration is proposed at 92%.

Thus the changed emphasis in the categories of A.I.D. assistance is more than cosmetic. The philosphy, the overwhelming concern in the Act and in the various Committee reports accompanying the Act, puts highest priority on reaching more directly the poor majority in the LDC's. Food and nutrition projects must have primary concern with the small farmers and their productivity, income and consumption. In health, there is a priority given to rural health delivery systems. In education, primary concern with mass-directed non-formal, practical, basic education.

And, particularly in the House International Relations Committee, there is the belief that objectives of poor majorities benefitting directly from aid can only be achieved if there is a greater degree of direct participation by the poor themselves in the development programs. The seriousness of this philosophy is evidenced in the following excerpt from a recent House Committee Report:

> "Activities that may happen to fall into the sectors of emphasis agriculture, rural development and nutrition; health and population; and education–but which these are not specifically designed to reach directly to the problems of the poor majority, are not in accord with the intent of the reforms.
>
> Moreover, activities should be judged not merely on whether they are intended to benefit the poor, but on

whether they are designed to enable the poor to take an active part in the economic life of the country and to lead more productive and dignified lives. The point is not handouts but participation."

Arguing the point even more forcefully, the Committee goes on to say:

"It is the committee's view that there is no need to carry out a U.S. bilateral development aid program in every poor country, or in every poor country where we have assisted in the past, or in every poor country of diplomatic importance to us. Recognizing the desirability of giving poor country government and AID missions time to adjust to the new direction, the committee believes that programs and missions should be phased out if, after an appropriate effort has been made the conclusion is reached that a particular country is at the moment unsuited to the kind of program envisaged in the 1973 legislation."

A.I.D.'s response to the changes has been wholehearted. As I pointed out earlier, the focus of our program is now concentrated overwhelmingly on the three categories emphasized by the Congress. Internally, new and more rigorous program design and review processes have been instituted to assure that the specific target group and beneficiary of each project has been identified, relevant social as well as economic analyses undertaken, baseline data and other evaluative material gathered, and attention paid to the participation of previously overlooked groups such as women.

Finally, there has been an almost overwhelming number of papers produced and research undertaken:

(1) to define the poor majority in operational and programmatic terms;

(2) to elaborate the concept and possible models of rural development;

(3) to assess the importance of local participation in project success; and

(4) to identify the basic causes of the inequalities in income and opportunity that exist in developing countries as well as the feasibility of measures to overcome them.

The program reorientation which I have just described is not unique to A.I.D. The program of each major donor searches for the same small farmer. Redefinitions of sector loan or grant policies, as well as the programmatic use of sectoral studies in defining investment or assistance strategies, now occur more frequently or widely than ever before.

The output of these efforts is indeed very learned and very provocative. My remarks have made no pretense to summarize their findings in any definitive way, yet as necessary as I find the discipline they impose, and find commendatory the high moral purpose the equity principles development assistance must now satisfy, I personally feel a sharper sense of disquiet than before about the results towards which these efforts ultimaterly may lead.

The approaches do risk, indeed, being more costly in terms of administration, management, delivery of inputs and training, and in time. Dependence on weak administrative structures of a majority of weak governments to reach the vast numbers of poor in the rural areas directly may be desirable, but impractical. Where the design or implementation of programs requrie major increase in expatriate personnel, these developments ignore major trends to the contrary. These costs have rarly been analyzed, and sometimes—through subsidized pilot programs—they have been hidden. Hence a lively debate must continue to occur over the means to carry out the new aid directions.

The relevance of the many ways that the poor might be reached cannot rely upon romantic notions of efficient small farmers on every plot of land in the world or of sweeping programs of redistribution to the poor. Admittedly growth alone does not guarantee equity in either an absolute or relative sense; neither do stagnant economies, nor do economies whose inability to compete with other market economies only lead to greater

marginality. Thus growth in some form is an essential ingredient of equity.

The energies and scarce administrative leadership of the LDC's will, indeed must, be largely focused on growth and we would do our best for the poor if we worked within that context, not in competition with it. Some of the difficulties that exist in addressing the problems of poor majorities within countries are related to the disequilibriums between economies in poorer nations and industrialized nations in the overall world economy.

A recent study of economic, political and social factors of inequality of income by Princeton University and the Brookings Institution soberly strips away any easy ideological approach to the problems of the rural poor, either by socialist, redistributive, administrative, market or other mechanisms. It concludes that any strategy must be a mixed one, i.e., one which works within the context of a growth strategy, one which accepts spill-over effects and political programs as a not insignificant (if not efficient) source of benefits to the poor, and one which deals realistically with the actualities of market and distribution factors.

Local participation of the people themselves is a *sine qua non* for effective development processes in project implementation. The ingredients and causes of that participation vary greatly in each case. The excitement over the "success" stories of often relatively small scale activities become muted when attempts to replicate them on a larger scale entail sweeping social and economic changes which are beyond the scope of any assistance program and beyond the capacity or desire of government. Frequently the administrative cost of such replications may be staggering.

It is not a coincidence that many of the examples of success with land reform and small farmer agriculture are of countries in a situation of convulsive exercises of power, and or as an accompaniment to rapid industrialization.

Egyptian cooperatives are lauded in some studies for their success with small farmers, but criticized in other worlds for their failure to reach the landless. What is the future of the marginal and landless farmer in India if even small-scale agriculture becomes predominant? Participation of the poor is thus not independent of the larger issues of development, and is not the sole ingredient for success.

II

I raise these issues not to be critical of the new aid directions, but precisely because these approaches are so important, and so fundamentally right in a moral sense, that nothing could be more damaging to our purpose than to fail in trying to achieve them.

But to avoid failure, we must resolutely avoid slipping into postures that are simply convenient, or simply ideological, or simply flattering to our own egos and conscience, but which do not deal with the real world of the poor and of the LDC's as sovereign, struggling, sensitive and proud countries—countries which face a complex, almost overwhelming world of economic and technological power outside their reach. It is their context, and their realities we must understand if we are to assist in helping the vast majority of the world's poor. And too, LDC's are not universes in isolation.

III

I have seen the list of papers to be presented at this conference. I am overwhelmed with their scope, and promise of experience, knowledge and insight. I look forward eagerly to learning from them. But in light of what I have said to you so far, I would be so bold as to propose three issues which this conference might ponder in the sessions ahead. Some of them are reflected in the titles of the papers. But I fear that they might, like the larger issues of rural poverty, be lost in the microcosm of each particularistic approach to our subject matter.

The first of these is to analyze more accurately our own histroical experience in the United States. There are many persons in this audience who have a lifetime of experience with the rural poor of our country. Yet almost none of this experience is reflected in the shape, philosophy or thrust of our present A.I.D. emphasis on the rural poor abroad. To what degree have the rural poor in our

country benefitted from government programs of rural development? Is there not a history of those programs being overtaken by other priorities such as production, gutted by the forces of discrimination, distorted by the force of local politics?

If relatively small, black farmers are successfully growing tobacco in North Carolina, how many are left growing cotton in Alabama and Mississippi, or apples in Virginia? How many have become part of the mainstream of American agriculture and how many the by-products?

What really benefitted most of the mass of rural poor in the United States—rural development or leaving the farms altogether, small-scale farming or jobs on large-scale agricultural "factories"? Where, in sum, have been the sources of income, services and benefits to the rural poor in this country over the last 100 years?

I raise this issue, not because the experience of the American rural poor is directly transferable to those of the LDC's. That would be as mistaken and chauvinistic as saying the experience of the Mid-West wheat farmers or the New York law firms is directly relevant to them. I raise it because understanding our own historical experience, the success and failures of our own rural development programs, the real sources of benefits that have come to our rural poor can help us understand, with humility, the difficulty of the task, the administrative burdens it poses, and at least the historical relationship of agriculture, industry, and equity in the development of our country.

The second issue I would pose is the style of American assistance. One of the great issues of development has always been how to transfer technology. Historically, we have used a variety of tools, but most relied upon sending Americans abroad as advisors and often as managers of overseas programs. Even our current concern with the rural poor carries with it possible demands for more overseas Americans: to gather baseline data, to study the local environment, to help promote participation at the grass roots level. But I would suggest that the age of relying on large contingents of overseas Americans is passing.

All of us of course pay lip service to the idea of minimizing the number of Americans overseas, and maximizing the direct leadership of the citizens of the LDC's. But how much of our knowledge, our research, our erudition is directed to that end? How much of the models, the case studies, the analyses that we will be discussing here carry a relevance that Kenyans, Tanzanians, Zairians can readily use? How much, by contrast, is useable only if Kenya contracts with more expatriate staff, sends more poeple off to get even more sophisticated Ph.D's, becomes—in effect—more dependent upon developed countries, not less?

Recently, at a conference of young African officials and scholars to review the problems of the Sahel, the Africans suggested that donor organizations design programs and define the managerial requirements of those programs in terms that disqualify Africans, and thus justify jobs for expatriates. Is there perhaps an element of truth in that charge? And might it be true of academe as much as assistance agencies?

The issue becomes even more critical as we undertake to help the "poor majority," the literally hundreds of millions of people in thousands upon thousands of villages. Who are they? Do the indices of income, life span suffice or might composite measures of dependency better serve as measures? The emphasis then would be on processes that are capacity factors which would be changing and would allow aid planners to better delineate within universes of poor—where priority actions must occur. Some us are still hung up, I fear, by the "Ugly American" image, the image of that good American with his immediate rapport and his humble understanding of the commonfolk who really helps them help themselves.

Many of the instances we study of grass root successes are indeed programs where a Missionary, an aid agency person, or a private American was a catalyst. These are noble efforts and they teach us much. Sometimes we tend to accept the successful instance as the model rather than discovering the pro-

cesses that the instance could reveal. But we are not going to place thousands of Americans in out of the way villages all over the world.

We are probably not going to have, for very long, large teams of American advisors and managers living in the capitals of the LDCs. Though, currently among the oil-rich apparently they contemplate thousands of expatriate advisors under reimbursable arrangements, I suspect their satisfaction with such arrangements cannot be long lived. Those are images from the past.

If we are going to assist the LDC's, we are going to have to find a way to make our knowledge, our science, and indeed our good will available in new forms. We need wholly new ways of teaching and transferring knowledge, using not only our intellectual capital but much more creative uses of modern technology to cut through traditional forms of learning. Recently, I was struck by the amount of analytical hardware that has emerged to handle remote sensing data from ERT's imagery and which allows for combining engineering, economic, and behavioral science analysis inputs.

Finally, I would ask you to consider what it means for the United States to direct its assistance objectives toward the poor majority. I have described how the A.I.D. program has been redirected to that purpose. But I now must add that even as we have moved in this direction, the real value per capita level of assistance from the developed to the developing world has fallen by 30% over the past decade. Some see in this a new role for the United States, i.e., that we be looked to for our expertise and skill, not for resource transfers.

I do not dispute the value of the expertise and skill we might assemble. Nor do I dispute that sources of capital may best come in the future from sources other than something called "aid." In fact I anticipate and expect that they should.

But I ask at the same time, given what we know of our own history, and of the great discrepancies between the wealth of the developed and developing world, of the importance of markets and technology to creating jobs, whether the United States as a whole can retreat into such a narrow role where the poverty of nations is concerned. The practicableness of the best designed low cost health delivery system becomes irrelevant in face of trends toward LDC's becoming poorer and with lessened capacities to manage these consequences, except as they possess petroleum or other minerals.

The kind of major departures in thinking which moved the world to new concepts about the nature of economic relationships between the nations of the world community at the time of the formulation of the Bretton Woods agreement, and the institutional arrangements which followed, is severely needed.

The issue is neither simply emotion laden appeals about a new international economic order. It is not simply a matter of commodity agreements. Nor do backs need to be stiffened in reaction to insure that all that is needed is to protect those few who consume most of the world's production from the many whose labor results in sharper anguish.

From the view of either the rich or the poor country, the technically and overwhelmingly complicated problem to be resolved is difficult, given the interdependence between industrialized economies and raw materials, primary product economies within the total world economy. There is a question of how might this disequilibrium be better avoided or lessened, and without the onus assistance arrangements have tended to create.

Those of us who are in the development community cannot retreat into concern exclusively with "pilot" projects and research, either on the excuses of lack of knowledge or because the larger problems of growth go beyond our immediate mandate. Our relationships with developing countries would surely suffer. Our own well being would be lessed materially.

The immediateness and scale of problems peoples in LDCs face, and the horrendous consequences in human and fiscal terms of underdevelopment, preclude satisfaction with

talk of isolated instances of rural development or social services, if no one foresees how the sinews of economic and political strength—whereby these instances can be replicated—can be a process in the LDC's as a whole. There are vital issues for the poor majority. And especially here, in this setting in rural Virginia, we have no reason to forget them.

I realize I have raised troubling issues. The Congress has put forward a noble cause, the most noble cause possible for us to follow. And I have raised questions about our historical understanding of this cause, about our capacity to assist in it, about the magnitude of our commitment. But I do so in the spirit of galvanizing us to do more here than add variations on the themes of poverty and development as they have been presented so far.

Let us be prepared to examine, through each and every specialty represented at this conference, whether we have yet uncovered the truths about the task before us, and about the role we can play in it.

PROBLEMS OF DEVELOPMENT IN AFRICA AND THE THIRD WORLD

BY

SAMUEL E. QUARM*

Looking at the papers presented so far at this conference, I find that practically all aspects of regional and international development have been treated both from the professional and academic stand-point. As is to be espected, however, these papers and speeches have tended to be rather restrictive since they deal with particular topics in this rather broad area of development. What I intend to do, therefore, is to treat the subject of regional and international development from its broadest possible angle, including especially the political aspect; for development as it relates to the Third World and the evolution of a new economic order and the consequent assurance of peace and orderly international relations is more political than economic.

I will do this from the point of view of Ghana and Africa whose problems are typical of the Third World at large. I have thus chosen as my topic "Problems of Development in Africa and the Third World".

African economic development has been hampered by two major constraints: lack of capital (and I include food in this category) and the lack of expertise. These constraints have been brought about by the centuries of economic exploitation and political domination which Africa and the Third World generally have suffered at the hands of the industrialized world. To draw attention to these constraints is not to find scape-goats for our nagging economic problems and so escape from our own responsibilities in finding solutions to them, but to bring a sense of balance and reality to bear on the whole issue.

Far from finding scape-goats, the Third World has faced this crucial challenge of development squarely and with enthusiasm, and all countries are using every possible means to generate capital, develop expertise and, through a series of Development Plans, to sustain a steady, even if modest, rate of economic growth. Different approaches have, of course, been adopted. Some countries, like Algeria have adopted socialism and nationalization of the means of production. Ghana has adopted a *mixed economy* whereby Government *participates* in the heavy and extractive industries by taking controlling shares in them, but allows local and foreign private enterprise to operate. Still others such as Nigeria and the Ivory Coast have leaned more towards the free enterprise system. It seems to me unimportant what road a country chooses to follow in its economic development as long

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as it knows clearly where it is going and how to get there.

But whatever road one takes, it is essential to put an end to uncontrolled foreign exploitation by establishing full sovereignty over one's natural resources. There can be no meaningful economic development in any developing country unless it breaks the strangle-hold on its natural resources by foreign interests. If I may use Africa as an example, all of the world's most important 53 minerals are found there and its iron reserves are twice those of the United States. Africa also has 42% of the world's cobalt, 34% of its bauxite and 23% of its uranium. And yet, according to UNCTAD statistics, Africa holds 16 of the 25 poorest nations in the world.

Moreover, according to the United Nations, of the 32 nations classified as so poor and so short of food that they are threatened with starvation, 20 are in Africa. It must be obvious that the major reason for this state of affairs is the hitherto uncontrolled exploitation of Africa's natural resources by outsiders who cart them away for a mere pittance without any attempt to porcess some of these resources on the ground and thereby generate the much needed local capital and expertise.

Another essential requisite for Africa's development is economic co-operation and integration on the regional and even eventually the continental level. One of the harmful consequences of the colonization of Africa was its fragmentation into a host of small unviable territories, some with oppulations of two milion or less. Not only will such economic integration assure a sharing of resources and expertise and the creation of a wider market, but it will ensure their very survival, for in the face of the movement towards larger economic groupings, even by the developed world, as witnessed by the EEC and COMECON, African States standing alone cannot but be swallowed up by these economic giants and conglomerates.

The East African Economic Community has long stood as a good example of regional co-operation, and remains a fairly strong and viable economic force in spite of its recent strains and stresses; and the Economic Community of West African States (ECC recently set up constitutes a commei and invaluable step in the direction of tive regional co-operation which w doubt will advance the economic develo of the area.

A third essential for African eco growth is for it to rely on itself basica its development. Though the effo regional and continental co-operation a policies of participation and nationali are fundamentally attempts at self-rel self-reliance needs to be adopted as a ca principle and an article of faith of eco development. The record clearly show no outside country or group of countri be expected to come to our aid in any n way as to make any meaningful impact economic development and to put strai their own affluence which they naturall to maintain and improve upon. This is say that all aid is worthless and unwelc but such aid, if indeed it is aid, can onl very marginal supplement to our own e and a drop in the ocean of our developn problems.

Foreign aid, if it is to be meani should contain a large portio non-reimbursable assistance and shoul related to the profits which foreign com make and repatriate from the recipient tries.

It is on record that between 196 1970 foreign corporations declared prof the tune of $23 billion from devel countries. This represented one and a times the total foreign aid grants for the period. Mr William Cotter President o African/American Institute, writing in November 1974 issue of the Africa R magazine, stated as follows: "In Afric companies (that is US companies) will $1.380 billion this year (that is 1974) African trade and investment. This is than five times the level of our develop assistance of Africa. Moreover the amou aid we do give goes almost entirely to chase Untied Stats goods and services, cr employment here (that is in the US) bolsters our own economic well-being"

Cotter was of course speaking about United States aid but his statement *mutatis mutandis* will apply to most donor countries.

It should be obvious that foreign aid as at present given and administered cannot be a substitute for fair trade. What Africa and indeed, the Third World needs is an arrangement which would eliminate the imposition of discriminatory tariffs and arbitrary prices for their raw materials and enable them earn the means adequate for their development.

The continuing poverty of the developing countries is largely attributable to the nature of the relationship which governs economic and technical co-operation between them and the industrialized nations. This relationship, which is a relic of the colonial system of domination and exploitation, has enabled the few industrialized countries to dictate for nearly five hundred years the prices of primary commodities produced and exported by developing countries. These resources form the back-bone of the economies of the developing countries, and determine the level of their prosperity. Not many countries are richly endowed by nature and for most developing countries they have only one or two resources they can depend on for their foreign exchange earnings and indeed for their survival.

On the other hand, prices of the commodities and products which the Third World has to import, of necessity, from the developed countries continue to rise out of all proportion to the prices of their raw materials. For example, the price of wheat doubled from July 1972 to July 1973 and nearly doubled again during the second half of 1973. The price of fertilizers most commonly used by the developing countries almost doubled between June 1972 and September 1973. Over the last five years the price of steel has trebled, that of tractors doubled and that of cement quardrupled.

And yet the industrialized world still fights shy of international commodity agreements which alone would ensure fair prices for the produce of the developing world. In the case of cocoa, for instance, after considerable haggling and delay, some kind of International Cocoa Agreement was initialled two years ago, but it has not been really complete and effective because the United States which is the biggest single consumer has callously refused to be a party. Cocoa accounts for 60% of Ghana's GNP, and therefore, any fluctuations in prices as is usual affects our developmental programme. From a high price of nearly one thousand pounds sterling per ton nine months ago, cocoa has now fallen to some six hundred pounds sterling per ton.

We are told to be contented, because six hundred pounds sterling is higher than the price cocoa fetched three years ago. An important aspect of any commodity agreement is the question of reference prices which should be acceptable to both producer and consumer countries and realistic enough to take into account such factors as the supply and demand position, the changes in currency parities, inflation and the development needs of the developing countries. Furthermore, the reference prices should be reviewed periodically and should be linked to prices of manufactured and capital goods that are imported by developing countries.

For more than a decade, Africa and the developing world have been clamouring for a more equitable economic order which would assure a fairer distribution of the world's resources and ensure a modest and steady growth in the economies of the developing world, but the response has been anything but encouraging. Under the auspices of the United Nations, various attempts have been made to find an answer, but so far only palliatives have been devised but no lasting solutions.

The United Nations Conferences on Trade and Development (UNCTAD I and UNCTAD II) have come and gone without any significant results. The UNDP and UNIDO are still plodding along but have made no real impact owing to inadequate funding, and the United Nations Development Decades which were launched with such fanfare and high hopes have also failed, simple because the commitments requried of the developed countries to set aside a mere 1% of their GNPs for development in the Third World have not been honoured.

There is also the problem of continued indebtedness to the industrialized countries which, by conservative estimates, amounts to some $80 billion, and the service on this debt alone is estimated for the current year to be approximately $9 billion. The Third World thus are caught in a vicious web of borrowing.

Though the economies of Africa and the rest of the Third World which are not oil producers have been seriously set back by the rise in oil prices, one cannot but be sympathetic with OPEC who are only redressing generations of exploitation by the industrialized world. OPEC have also, by their action, drawn attention to the economic inter-dependence of all countries—rich and poor, developed and developing—and the need for restructuring the world's economic order to assure a more equitable distribution of its wealth. This is a legitimate demand which is essential for the development of the Third World and which can only be opposed by those wishing to maintain the *status guo* to their continued advantage.

In sum, the serious problems of the development of Africa and the Third World countries can be resolved primarily by their own individual and collective efforts. They have to exercise full sovereignty over their natural resources and control their exploitation as well as the machinery for the determination of their prices. They have to institute an integrated and coherent process of development which should aim in particular at the full realization and diversification of their agricultural potential and the creation of a solid industrial base by the processing locally of their natural resources. But whatever their determination or sacrifice, however sound their development plans may be, they can only emerge from their economic stagnation when there is a fundamentally new international economic order based *inter alia* on equitable prices for their produce and an effective say in the conception and operation of the international monetary system.

Colonel Acheampong, Head of State of Ghana, in his contribution to the New York Times International Economic Survey of 26th January this year, put the problem succinctly thus:

> "The international community has gradually realized that the major problems retarding the progress of man and the enhancement of his wellbeing can be tackled definitively only if concerted international action is forthcoming.
>
> We can restructure the world economy by eliminating trade barriers, by relating primary commodity prices to the cost of industrial goods, by dismantling cartels that had become essential for protection because the present system does not offer justice and by establishing a new moentary system that will be the product of the genius of all sectors of the world economy."

This, the restructuring of the world economy, ladies and gentlemen, is the greatest challenge of our time. We are now on the threshold of a veritable POLITICAL *detente* by the signing today in Helsinki of the European Security accord. This has been possible because of the stark realization that undue political confrontation serves us all ill and may indeed lead to our destruction.

The world now cries for ECONOMIC *detente* which alone will ensure the orderly progress of us all, developed and developing countries alike. It is our hope and prayer that reason and enlightened self-interest will make this possible.

FISCAL PLANNING AND DEVELOPMENT: AN INTERPRETATION OF PURPOSES, CONSTRAINTS AND CONFLICTS

BY

RAWLE FARLEY*

Fiscal, Policy, Poverty, and Survival

Fiscal policy in the developed country and the developing countries involve the same trilogy of financial functions—taxing, spending, and borrowing. The exercise of these functions, however, in the developing countries has a far more urgent aspect. In a poor society, fiscal policy becomes in effect a composite body of deliberate measures designed to counteract the further accumulation of misery. It is part of the total attempt to move the economy forward.

Poverty is by definition the dominating problem of the developing country. The United States, for instance enjoyed a GNP per capita in 1972 of over $5,590 but the GNP per capita of Bolivia was still only $200. In Niger, Indonesia, Burma, Guinea, it was $90 and in Chad, Ethiopia, Somalia, and Mali, $80. The GNP per capita of Upper Volta, Burundi, Bangladesh, and Rwanda was even below this figure. Africa, as a whole, had a per capita of only $240; Asia, excluding Japan, of $170—a contrast of Europe (excluding USSR) with a figure of $2,190, and North America.[1]

One estimate suggests that in 1969, 17.4 percent or 42.5 million Latin Americans had an annual per capita income of less than $75. U.S. The corresponding figures were 57.2 percent or 499.1 million for Asia and 43.6 percent or 36.6 million for Africa.[2] Income inequality is paradoxically desperate in poorer countries. In Kenya, for instance, in 1969, the top 20 percent received 68 percent of the total income, and the bottom 40 percent only 10 percent. In Jamaica, the corresponding figures (for 1968) were 61.5 percent and 8.2 percent, respectively.

Half of the world's population, 2,000 million people, are estimatedly undernourished and at least 460 million are actually starving. The vast majority are of course in the

TABLE 1

World and Regional Population Projections
(Millions)

	World	Africa	Asia	North America	Latin America	Europe	Oceania	USSR
Mid-1969	3,551	344	1,990	225	276	456	19	241
2000 Projections, UN Constant Fertility	7,522	860	4,513	388	756	571	33	402
Percentage Increase	112	150	127	72	174	25	74	67

Source: *1969 World Population Data Sheet*—Population Reference Bureau, Washington, D.C. For Latin America, see detailed analysis in Rawle Farley, *The Economics of Latin America: Development Problems in Perspective* (N.Y.: Harper and Row, 1972), pp. 12–33.

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developing countries. The Sahel crisis is a lurid case of social desperation.[3]

Clearly, this context exercises, or ought to exercise, a positive compulsion in that the efforts of the developing country are directed, or must be directed in the first instance to ending this state of poverty. 'Gappery' approaches are condemned in some quarters, but it is difficult not to be alarmed by a calculation that it would take Uganda 457 years, Peru 520 years, Malawi 727 years, Pakistan 1,760 years to close the per capita GNP gap between these countries and the United States.[4]

There is no doubt that if matters are simple left to take their course, the existing inertia would take too long a time to disappear to meet the needs of a rapidly growing population. The table below shows readily how rapid this population growth is.

Laissez faire obviously cannot meet the demand for development *now*. Government is, therefore, compelled to enter positively into the picture to help usher in revolutionary changes in the economic landscape. Fiscal policy represents part of the deliberate range of public interventionism. Government intervention in the market economies of the developed countries (bringing with it the substitution more frequently than otherwise of the cyclical budget for the traditionally balanced budget) is of course nothing new, particularly since the debacle of the 1930's. The obstacles confronting fiscal intentions in developing countries are, however, enormous and many-sided, and reflect, on the whole, the qualitative differences between the developed and the developing society.

Assumptions

There are several assumptions in this paper which ought to be clarified at once. First, I assume that the priority emphasis of the country is on economic transformation and not on the preservation of personalized omnipotence in the midst of stagnation. Second, despite the continuing controversy on the meaning of development, [5] I assume that agreement is possible on at least a few key variables which have to be changed in the economy in the interest of development. These would include changes in human and physical capital accumulation, sectoral shifts changes in income distribution, in employment opportunities, changes in export and import composition, and, above all else, recognition of the key role of innovational abilities.[6] Thirdly, despite Peter Heller's brave attempt to measure and test (where Walter Heller theorized so splendidly[7]), I am assuming that public fiscal behavior is subject to the widest possible range of aberrations—depending on prevailing ideology, personal foibles, political balances, internal realities, and international complexities. Fourth, I am assuming a public and private sectoral arrangement and an entrepreneurial society in the sense in which I have recently defined entrepreneurship.[8] The society must want to implant innovations all along the line to bring about a decisive transformation in the existing economic landscape. Keynesianism is, however, largely inapplicable since adequacies in the quantity and quality of manpower, natural resources, capital, technology, business organization, entrepreneurship, governmental capacity, and institutionalization cannot be taken for granted nor is the deficiency in aggregate demand the source of the underdevelopment equilibrium.

With these *a prioris* in mind, the paper attempts a limited indentification of a few prominent and critical problem areas which fiscal policy confronts in a large part of the Third and of the Fourth Worlds.

Initial Drawbacks

Fiscal policy, *ipso facto*, implies the use of incentives and disincentives to accelerate the capacity of the economy to produce. This can be done much more effectively if a country knows where it is in order to assess where it could be, and by what means and at what speed. Fiscal policy, however, faces initial drawbacks in many developing countries in the lack of statistics, in the lack of any resources inventory, in the inadequacy of depth studies, in the lack of trained personnel; and, because fiscal policy is such a new exercise in many developing countries, there is the additional difficulty of anticipating public reaction. This difficulty can in turn debilitate

fiscal boldness, even where such boldness is justified.

Lack of Statistics

The earlier 1963-1968 plan for Jamaica, for instance, indicated a deficiency of data on income distribution. Research was actively proposed in Jamaica to fill important gaps. In many developing countries research has intensified, but research takes time. In so far as these gaps remain to be filled, to that extent then fiscal policy remains a shot in the dark. Venezuela was lucky in that a Commission to study the Fiscal System of Venezuela in 1959 found the lack of data on the distribution of income "a formidable obstacle," and recommended at that time the setting up of a tax research group in the Ministry of Finance as well as the giving of appropriate training to tax officials.[9]

The problem of data in this area still persists for less developed countries as a whole. The chief of the Income Distribution Division of the World Bank's Development Research Center recently emphasized "the need for better data on the sectoral distribution of the poor, their occupational characteristics, and educational levels, their ownership of productive assets, and their access to key production inputs."[10] Donald Snyder in a useful recent research effort notes for instance that the study of household saving in the developing countries was "at best in its infancy." Econometricians, with serious data problems facing them had to interpret behavior for many cultures at various stages of development. Many potentially important influences on saving, he concluded, such as the extended family and direct taxation, remained almost unexamined.[11] A. P. Thirlwall working on the relation between inflation and the saving ratio confronted an absence of long runs of time series data allowing an examination of the significance of inflation "in the context of individual countries."[12] A recent IMF study of tax ratios and tax efforts in developing countries had to exclude Chad and Somalia on the grounds that adequate cross-section data could not be obtained from these countries.[13]

Lack of Trained Personnel

The development of fiscal policies implies *pari passu* first class administrative management of the difficult exercises involved. Apart from the fact that the best management will be frustrated by lack of data on such matters as the effect of various taxes on work, on consumption and savings, on price and output, and on investment, the number of first class fiscal administrators is obviously limited. Frustrating levels of literacy and ratios of enrollment at elementary and secondary school levels indicate the severe constraints to be overcome in solving the high talent manpower problem.[14]

TABLE 2

Education: Selected Statistical Comparisons

	United States	Africa	Asia	Latin America
Literacy	98	17	38	70
Students as percent of 5–14 age group	84	33	45	58
Students as percent of 15–19 age group	76	11	25	37
Students as percent of 5–19 age group	82	27	40	52

Source: *Africa Economic Growth Trends.* U.S. Agency for International Development, October 1974.

Public Reactions: Depth Studies

Popular acceptance of fiscal measures is also extremely important, and depth studies on social and psychological attitudes are of very great importance. Compulsory savings levies in Nkrumah's Ghana and higher taxes in Guyana did not go unquestioned.[15] Nuisance taxes on tea and stamps led not only to tax evasion but also to a slight trans- Atlantic disagreement in 1776!

In the Sudan in 1969, protests forced the withdrawal in 1970 of a progressive emergency tax with rates ranging from 5 to 10 percent of personal income, replacing this with a relatively light proportional defence tax fixed at 2 percent of income.[16]

Counteracting External Financial Dependency

Most developing countries want to escape from external financial dependency. This is a frequently explicit objective of fiscal policy. Capital is, of course, a key input althought the absence of capital is not the only key constraint to development. Table 3 shows that the exceptional economies, as I have called Libya, Saudi Arabia, Kuwait, Abu Dhabi, Qatar, and other capital surplus economies, do not come under the severities of capital scarcity! However, domestic savings and foreign aid in the form of loans and/or grants are key elements in the conventional development planning models, assuming that inadequate local savings cannot compensate for the enormous deficiencies in domestic capital resources. An independent country is free to circumvent this model.[17] If the country is in a desperate hurry to get on, the opportunity costs come in terms of desperate pressures to mobilize capital from internal sources, increasing the severity of already low consumption levels. If the country is not in a hurry to accelerate the economy, existing conditions are changed at a slower pace.

Circumstances differ from country to country. Economists should not assume that 'rational' means the same principles of choosing all along the line. Fiscal decisions in this area are a twisted battle ground of normative values and positive facts depending on values and on situation.

Any good economics text leaves the illusion of a binding body of orderly principles that we economists have got hold of the achieve the target variables of Peronist economics as easily as for Burma's retreatist choices![18]

TABLE 3

Estimated Oil Revenues and Per Capita GNP of Nine OPEC Countries

COUNTRY	Estimated Government Oil Revenue ($ Millions)		Estimated Per Capita Government Oil Revenue		Per Capita GNP
	1972	1974	1972	1974	1971
Saudi Arabia	2,988	19,400	393	2,456	540
Iran	2,423	14,930	79	461	450
Kuwait	1,600	7,945	1,758	7,223	3,860
Iraq	802	5,900	80	551	370
Abu Dhabi	538	4,800	11,700	43,636	3,150
Qatar	247	1,425	1,941	9,500	2,370
Libya	1,705	7,990	820	3,631	1,450
Nigeria	1,200	6,960	21	114	140
Algeria	680	3,700	45	233	360

Source: James W. Howe *et al, The U.S. and the Developing World, Agenda for Action 1974.* N.Y.: Praeger, 1974, p. 183.

If the normative values of the society or contemporary rationalization lead to a rejection of foreign capital input, Government's new activist innovating role as well as Government's traditional responsibilities can be supported only by domestic revenues. In most developing countries—especially those outside of the exceptional economies—revenues are relatively inelastic. A study of the Sudan, for instance, concluded in 1973 that the Sudan had reached "the upper political—if not economic limit— of its taxable capacity" and that it would not be possible to increase revenue very much more, whether directly or indirectly. The Sudan could not get much revenue from indirect taxes on luxury goods. Annual reforms were made in the income tax between 1964 and 1970, but yields were inadequate. Any further tax on basic necessities would have met with opposition from the administration as from the large numbers of small and scattered producers.[19] Tax evasion and inefficiencies in tax administration add further uncertainties to existing problems springing from these revenue limitations in developing countries.

Tax Collection and Tax Administration

Tax evasion, tax defaulting, and inefficient tax collection are still serious obstacles to the efforts being made to mobilize local capital. Immediate change is not easy. In fact, there might be no change for a very long period in several less developed countries. The persistence of tax aberrations dependent not only on administrative and technical values of the power elite. Developed countries, of course, have their problems, but in less developed countries the opportunity costs of a defaulting tax system are obviously more painful.[20]

A few examples of intial conditions and of possiblities would be sufficiently indicative. A 1957 study estimated that 400,000 in Western Nigeria did not pay income tax.[21] The United Nations estimated in 1960 that 99 percent of the Indian population, and about 93 percent of the taxable income of India remained outside the purview of the income tax system.22 In some developing countries, lack of communications and large distances would make it less costly for government *not* to collect *some* taxes. In Latin America, the Inter American Development Bank, O.A.S., and U.S.A.I.D. spotlighted some of these obstacles. In the Dominican Republic in 1962, for instance, as a result of improved administration, tax collection, and the institution of a new income tax law combining the cedular and unit systems (that is, levying taxes on incomes by reason of *both* origin and total), income tax collections increased 30 percent by the end of that year.

In Honduras, some hope of increased collections followed O.A.S. help in measures to amend the tax system and increase the efficiency, methods and procedures for collection and verification, and the adoption of modern procedural and auditing systems. These examples could be multiplied, at least for Latin America. Improved customs administration and collection of customs dues are clearly possible. Excise taxes and property taxes could yield better results. Customs duties, however, do not usually give returns in proportion to the growth of the economy. As for excise taxes or export taxes, returns are necessarily uncertain. Property taxes usually constitute only a small portion of the government's total revenue. In Jamaica, the contribution dropped from 17 percent in 1954 to less than 2 percent in 1963. The Jamaica Government thrust into the unavoidable entrepreneurial role we have already referred to, had to increase property taxes along with excise and customs duties to meet an increased current revenue to GDP ratio which had changed from 19 percent in 1972 to 21.4 percent in 1973 and to cover a rapidly increased overall deficit of 74 million Jamaica dollars. Even so that property tax represented only 6.1 percent of the tax revenue of Jamaica in 1969- 1971.[23]

Except for Singapore (27 percent), Nepal (23.9 percent),Taiwan (14.5 percent), Lebanon (12.5 percent), Turkey (10 percent), the property tax continued to contribute only a law share of the total tax revenue in 1969 to 1971 in most developing countries. Given the significant underutilization of land in many developing countries and the conspicuous consumption factor, the property tax may in-

crease in an experiment to stimulate more productive land use. However, only research can supply adequately founded data to evaluate revenue elasticity as well as the effect on land use.

TABLE 4

Selected Countries: Composition of Tax Revenue
(in percent of total)

Country	Total Direct Taxes	Total Indirect Taxes
Bolivia	21.2	78.8
Brazil	13.6	74.5
Burundi	35.2	64.9
Egypt	26.3	66.2
Ghana	23.2	76.9
Guyana	44.5	52.2
Ivory Coast	19.1	77.0
Jamaica	51.7	48.2
Kenya	42.2	52.5
Sudan	10.8	89.1
Tanzania	33.2	62.7
Togo	17.3	74.8
Trinidad & Tobago	63.1	36.9
Mexico	54.1	44.4
Upper Volta	45.5	54.5
Venezuela	83.9	16.2
Zaire	26.4	72.8
Zambia	61.1	35.9

Source: Raja Ghelliah *et al, op. cit.*, pp. 196–197.

Table 4 indicates a continuing issue. In the majority of developing countries, indirect taxes dominate the composition of the revenue. The tax structure thus remains regressive. Jamaica and Mexico have become exceptions, but clearly the redistribution of fiscal pressures is a long way off for most developing countries. The lower the level of development, the higher the level of regressive taxation.

Tax Ratios: the Question of Equalization

We turn now to the question of raising the ratio of taxes to the GNP in developing countries. This is obviously a perennially urgent issue. The ratio of taxes collected to the GNP in developing countries is on the whole rather low.

This imposes further limits on fiscal manoeuvre. In the United States, as in most developed countries, the ratio of taxes to the GNP approximates to 30 percent. Table 5 shows the considerable improvement which has taken place in many developing countries. The ratio for Brazil and Jamaica, for instance, in 1962 was only 10.9 percent and 14 percent respectively. But although the ratio say for Bolivia has nearly doubled from 4.8 percent in 1962, the ratio in 1971 remains low. In Haiti, with a per capita GDP of $110 in 1971, the ratio actually dropped from 9 percent in 1962 to 5.7 percent in 1972.[24] Even Burundi with a per capita income of $64 a head in 1972, the poorest in Africa, had a better ratio. In fifty developing countries, the average tax ratio increased from 13.6 percent in 1966-1968 to 15.1 percent in 1969-1971. In contrast the sixteen developed countries of North America and Europe had an average ratio of 26.2 percent.[25]

Given the inefficiencies in tax collection, the extent of tax evasion, the prevailing distri-

TABLE 5

Ratio of Total Taxes to GNP, 1969–71: Selected Developing Countries

Country	Ratio	Country	Ratio
Zambia	32.7	Honduras	11.7
Brazil	28.7	Burundi	11.5
Trinidad & Tobago	27.2	Togo	11.3
Guyana	25.4	Bolivia	9.2
Tunisia	24.7	Guatemala	8.9
Venezuela	22.0	Ethiopia	8.7
Jamaica	20.5	Nepal	4.4

Source: Raja Chellial *et al, op. cit.*

butional inequities, the low rate of investment in relation to the needs of the economy, the case for raising the tax ratio in the developing countries to that of the developed countries seems water-tight. In Latin America, the investment/GDP ratio, according to Raul Prebisch's calculation, must be raised to 26.8 percent to generate an 8 percent annual growth in the GNP by 1990. Andrew Kamarch estimates that a 2 percent increase in the African GNP (South Africa excluded) would require an extra annual investment expenditure of 2.4 to 2.7 billion dollars a year.[26]

The Government of any independent country has the legal right to raise tax ratios to any level that it deems fit. Government can therefore raise the ratio of taxes to the GNP to an equal level with that of the developed countries. Nonetheless the matter is not as simple as the right to act in this way. A model for 100 percent success to any such equalization thrust can be immediately set up. The thrust would be successful if the country initiating this policy fully controlled the mobility of all local entrepreneurs, fully controlled the acceptability of its actions, and was able through this action to mobilize all the resources required without any resort to sources outside of the country and to guarantee productivity responses as desired. These are of course, not an exhaustive set of conditions.

Other things are not as equal as the model prescribed. For one thing, even if the level of tax collection is raised to that of the developed countries, the amount of money collected will be immediately far less than required by the poor economy—unless there are exceptional situations for the time being, as in the case of oil and to a smaller extent, bauxite. Bargaining power has certainly ushered in some spectacular results, but bargaining power is not equal for all countries for all commodities all the time. Again situations may or may not change in the long run. In the case of oil, for instance, would new technology ever make oil obsolete, when, and to what extent? What is the character of the interdependence in a world of mercurial shifts? In the case of sugar, bananas, cocoa, nutmegs, and so on, it is clear that leverage power, as I have called it, is far lower and fiscal adjustments call for far more complex judgment!

Apart from administrative constraints, there are at least two principal problems to be taken into account in equating the proportion of taxes collected in most developing countries to that in the developed country. These are:

a. the effect of any such action on local and foreign investment
b. the attitudes of the trade unions where trade unions are free to operate.

So far as private investment is concerned, an increase in taxes means an increase in costs, unless (in exceptional cases) the whole increase can be passed on. An increase in costs means reduced profit expectations. Unless the market possition of the firm can offset this. Reduced profit expectations can induce the

entrepreneur–local and foreigner–to move elsewhere. The American South, the British "depressed" areas as well as every other developing area are today offering competitive tax concessions and tax shelters. If the innovating elements move out, expected development could be stymied. Hence, despite ideological declarations, in many developing countries, an excruciating, yet necessary price is being paid to attract, retain, and expand the number of innovators. That price is the temporary dilution of the principles of distributive justice, a retreat from textbook fulfillment of Adam Smith's canons of vertical and horizontal equity. The need for output necessarily takes the edge over the justifiable demands for welfare. To him that hath even more shall be given in the interests of increased output but not necessarily increased employment if capital intensive methods (growth criteria) give the competitive edge over employment criteria.

The consequence of this choice is the emergence of the second great obstacle– the attitude of the free trade unions. The trade unions in many developing countries are, by tradition, interested not so much in entrepreneurship but in distribution.[27] In a continent like Latin America their attitudes are reinforced further by the striking maldistribution of incomes. The upper 5 percent of the Latin American population account for 30 percent of the total personal consumption. The 50 percent at the other end account for only 20 percent.[28] The trade unions then may not be willing to accept increased tax burdens in the face of a policy, necessary though it is, to improve profit margins through tax concessions and tax shelters to private entrepreneurs. And they may not be willing to stay where they are wage-wise in the interest of maintaining competitive export prices and of investment of extra resources into capital formation.

In theory then, tax levels in developing countries can be raised to a level proportionate with the GNP in the United Kingdom and in the United States. But in fact since private investment matters and the aspirations of the trade unions matter equally, the fiscal policy maker is forced into adjustment and compromise with "realismo."[29]

Expenditures–Conditional Drawback

Inadequate domestic revenues obviously restrict a developing country to very narrow limits of manoeuvre with regard to spending. Not only are revenues inadequate, but dependence upon one produce or a few primary products introduces elements of uncertainty. Unless the country's major export is protected by long term contract, it would be clearly injudicious to presume that earnings from the major export of the country would not fluctuate. Brazilian coffee, West Indian sugar, and Ghanaian cocoa are cases in point. Kuwait, however, with oil as its major source of revenue would be in a very much different position! Except again for a country like Kuwait and similar type exceptional economies as I have called them (See Table 3 above), export earnings are not likely again to be adequate for initial development needs. The developing country is therefore forced to borrow from abroad–unless the country wishes to exercise its freedom to remain where it is. Burma chose to stay where it was.[30] Tanzania sat out conditions.[31] Cuba switched its foreign "aid" linkages and another modification in its hemispheric relationships is about to take place. Mexico and Venezuela are about to become the new "donors" within Latin America just as the USSR, China, Israel and the Arab world have become the new "donors" in Africa and elsewhere in the developing world. International agency leading and the forging of more and more bargaining groups among developing countries, shroud the extent of external financial "dependence" but this hardly puts an end to the search for external supplementary resources. Kamarck estimates that Africa would need at least 1.5 to 2 billion dollars a year of foreign capital inflow and technical assistance expenditures in the next decade.[32] In 1972 the net flow of official and private financing from the Organization for Economic Cooperation and Development (OECD) to the developing countries and multilateral agencies amounted to some 1915 million dollars.[33]

Two points are important here. First, the escape from foreign financial inputs is not as

fast as "ideologically" conceived. The Japanese, in addition to a steel mill at Auburn, are said to have the best thoroughbred racing enterprise in America. Fiat is doing business in Russia and the Russians have a bank in Paris which they report is making a handsome profit! In the developing countries, the inputs are not only more massive but in many cases too critical for domestic comfort. United States bilateral financing to Latin America, for instance dropped from $372 million in 1971 to $361 million in 1972. This decrease adversely affected Latin American investment resources and the Latin American capacity to import particularly capital goods. In turn, Latin America had to seek alternative and more expensive forms of financing and the opportunity costs had to be paid in terms of an increased external debt service. Second, lending money tends to be an extraordinarily conservative exercise, whether it be from citizens to their government, or government to government, or international agency to government, or a private corporation to government. The best terms which can be got would depend on mutual bargaining situations.

Whatever the outcome, one variable which would affect external investment flows would be the proved capacity of the developing country to deploy its domestic resources, however limited these are.

Given the limits to manoeuvering, fiscal policy to proceed more smoothly requires that

a. the fiscal policy maker recognizes the strict limits to borrowing from abroad

b. exercises the greatest care in determining and following through on priorities, judiciously balancing expenditure for production and expenditure for welfare.

Borrowing

Since borrowing seems unavoidable, fiscal planning involves guarding against an insupportable burden of debt charges on the country's recurrent revenues. The Jamaica Plan, for instance, for 1963-1968 calculated that some 68 percent of the total expenditure had to be covered by external loans. In Latin America, external debt tripled between 1960 and 1970 from just over 7 billion to nearly 22 billion. The alternative costs are serious in that in some countries the service burden of external public debt amounted to over 20 percent of current export revenue.

The principles involved here are very clear. Fiscal policy makers have to work out careful plans for the use of the expected loans and for repayment. Debt charges have to be met whether the loans are soft or are raised on the commercial market. A debt charge is an extra tax to be paid and may or may not constitute a disincentive. As a general principle, capital raised abroad has to be most carefully invested so as to meet these debt charges and still leave a surplus for development purposes. If this care is not exercised, badly needed domestic resources may have to be withdrawn from the economy to meet debt charges on foreign loans.

The Need for Debt Limitation

Since debt burdens might become obstacles to sound fiscal planning, it might aid sounder fiscal policy if some limits were established to debt incurrence. The case of Puerto Rico is interesting in this regard. Puerto Rico under the Federal Relations Act was forbidden to have a public debt "in excess of 10 percent of the aggregate tax valuation of its property." Puerto Ricans did not throw this principle out of doors on the acquisition of Commonwealth status and fiscal autonomy. A plebiscite in 1961 supported the substitution in Puerto Rican law of a limitation of 15 percent of the annual revenues, averaged for every two fiscal years. These Puerto Rican provisions for debt limitation reinforce the security provisions for public debt under which all general revenues are available for payment of debt service and the principal and interest of the public debt of Puerto Rico are a first charge on all revenues of the Commonwealth.[35] The ratio of debt charges to the average revenues will certainly put a limitation law to an interesting test in many developing countries.

Loan Defaulting

The paradox is that most developing countries will depend upon a flow of external investment in order to improve significantly domestically generated savings through increased incomes and to reduce their dependence on external sources of capital. In Puerto Rico the net use of external capital funds amounting in 1947-49 to some 65 percent of gross investment declined by 1959 because with the growth of Puerto Rican income, domestically generated savings had increased substantially.

Loan defaulting can do serious damage to a country's image and to a country's chances of reaching an improved fiscal position. Perhaps legal limitations to debt as well as legislation making debt repayment a first charge on general revenues may be useful fiscal innovations.

Expenditures and Development Needs

Wide differences make broad generalizations with respect to expenditures impossible. However it is clear that since economic development is the priority objective of fiscal policy, there is little elbow room for resources to be invested in areas other than in production and infrastructure related to the assessed development needs of the country. Each country determines its own priorities but in every case alternative costs are involved. It is interesting to note that Ghana in 1973 spent the largest share of its budget on education—21 percent as against 8 percent for national defense. On the other hand, Tanzania in 1973 spent as much for defense as it did for education. In Haiti, defense in 1972 absorbed 25 percent of the budget, double the proportion for public health and for education respectively.[36] In the Dominican Republic in 1961 military expenditure in contrast to 7.7 percent for public health, 6.6 percent for education, and 6 percent for agriculture. At that time, 52 percent of the urban housing units were sub-standard, and the rural areas in a worse condition: 83 percent of the urban population were without sewerage and 40 percent of the population above 15 years illiterate. In 1971, however, the Dominican Republic was devoting some 20 percent of its budget to education.[37] In Argentina, Juan Domingo Peron left behind state-owned enterprises operating in 1960 at a loss of 18.3 billion pesos, and feather-bedding to the extent of a labor force of 75,000 workers, whose numbers or wages Frondizi found it impossible to modify in the interest of stabilization.[38] Where aberrations of this kind are constitutionally possible, no effective system of progress reporting can be developed and wasteful expenditures go unchecked.

Agriculture

The importance of agriculture in developing countries is self-evident. Because of this self-evident importance agriculture is traditionally supported by Government. The plantations are supported as well as the peasantry in differing ways. The plantation never ceases to be the focus of the taxation debate. In the case of the peasantry however, for one reason or another, there are few areas where government subsidization demands a *quid pro quo*. That *quid pro quo* is to confront the peasant with a reasonable tax which can only be covered by improved production. The absence of any such *quid pro quo* would constitute a waste of funds and a retreat from the priority objectives of fiscal policy. Moreover, the industrialization of the countryside is essential to counteract both urban unemployment and rural depression. This requires a whole series of incentives for rural development.[38]

Misdirected Private Spending

Any continued misdirected spending and investment stands in the way of the principal objectives of fiscal policy. Governments must therefore devise reasonable discouragements and encouragements to attract spending and investment into considered development channels. In Trinidad and Tobago under their original plan for 1964-1968, fiscal policy aimed at supplying incentives to encourage the substitution of expenditure on housing for expenditure on drink and tobacco.[39] Fiscal policy must aim similarly at discouraging investment in real estate, commerce, and overseas financial assets in favor of investment in domestic manufacturing and agricultural industries.

The Small Businessman

The shortage of entrepreneurship is obviously an obstacle to more rapid advance in a developing society. Yet fiscal policy can help to remove this obstacle by greater support of the small businessman. Absorption in the affairs of the large local or foreign business corporation is too generally accompanied by an indifference to the need for supporting and developing the existing cadre of local risk-takers. Fiscal support can be used to enable an increasing body of local entrepreneurs, with their more intimate knowledge of the country, to assume larger risks, and to gain competitive strength. Fiscal indifference to the "small man" appears as one of the important obstacles to be overcome in many developing countries.

Conclusion

Fiscal objectives in the circumstances of developing countries represent a vital part of great national purposes. Unless the objectives of fiscal policies can command responsive support, the aims of fiscal policy may remain ineffectual propositions on paper. Passions, according to interests, are generated one way or another by fiscal policies– for no one escapes the fiscal nexus. The only possible way of overcoming the retarding barriers of passion is through forging a high degree of consensus under which all interests are sensitively taken into account. Education once again can discipline the emotions and the tastes so that the efficiency, ingenuities, and restraints which fiscal objectives require are no longer looked upon as insupportable.

FOOTNOTES

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[12] A. P. Thirlwall, "Inflation and the Savings Ratio across Countries," *Journal of Development Studies*, Vol. X, No. 2 (Jan. 1974), p. 170.

[13] Raja J. Chelliah *et al*, "Tax Ratios and Tax Effort in Developing Countries, 1969-1971," IMF *Staff Papers*, Vol. XXII No. 1 (March 1975), p. 188.

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[16] Ali Ahmed Suliman 'Deficit Finance and Economic Development in the Sudan," *Journal of Modern African Studies*, Vol. II No. 4 (Dec. 1973), p. 547.

[17] Paul Bomani, "Tanzania's Road to Development: Bringing Development to the People," *International Development Review*, Vol. XVII, No. 2 (1974), p. 9. "Much to our disappointment, we are not getting much aid and assistance, but we don't care. If aid would enslave us, we would rather do without it."

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[25]Raja Chelliah, *et al, op. cit.*, p. 189.

[26]Andrew M. Jamarck, *The Economics of African Development*, New York; Praeger, 1971, p. 305.

[27]Cf. Rawle Farley, *et al, Industrial Relations and the British Caribbean*, London: University of London Press Lts. 1961; also Rawle Farley, "Caribbean Labor Comes of Age," *Free Labour World*, International Confederation of the Free Trade Unions, Belgium, No. 94, pp. 2934.

[28]See Rawle Farley, *The Economics of Latin America op. cit.*, esp. pp. 92-98; also Montek S. Ahluwalia, *op. cit.* pp. 3-8.

[29]See Rawle Farley, "Puerto Rcio Development, Urbanization and Integration," in International Institute of Differing Civilizations, *Urban Agglomerations in the States of the Third World: Their Political, Social, and Economic Role*, Brussels, Belgium; Collections de l Institut International das Civilizations Differentes Editions de l'Institute de Sociologie Universite Libre de Bruxelles, 1971, pp. 610-635.

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[32]Andrew Kamarck, *op. cit.*, p. 305.

[33]Inter-American Development Bank, *Economic and Social Progress of Latin America .... 1973, op. cit.*, p. 62.

[34]Cf. Alison K. Mitchell, "Foreign Investment Legislation in Africa," *Finance and Development Quarterly* No. 1970, pp. 7-11.

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FINANCING DEVELOPMENT IN SUB-SAHARAN AFRICA —A REAL RESOURCES APPROACH*

BY

C. P. CACHO**

There is a noticeable gap between the current notion of the main objective of development activities in less developed countries, and the conceptual framework which determines these activities. For decades, economic growth reigned as the supreme objective. More recently, the realities of experience based on this objective and of increased knowledge and appreciation of the nature of underdevelopment, have combined to displace growth with the more encompassing concept of development.

The trickling down process expected of the growth-oriented approach has often not occurred. Income distribution has tended to become more skewed, dualism more pronounced, and the poor relatively poorer. Development emphasizes broadly-based social transformation and is more relevant to the needs of poor areas. Nevertheless, the change of objective risks have little real meaning if the concepts which influence development activities are not similarly changed.

The most telling evidence of the lag between current thinking on development objective and consideration which determine development activities, is the continued dominance of the mechanical Harrod/Domar type approach with its essential focus on growth. The basic concept of Harrod/Domar is not necessarily in conflict with development as the objective, however, the concept cannot be separated from the meaning it has acquired and from its application in practice. Both meaning and practice have severe defects for achieving broadly-based social transformation. Saving and investment tend to be viewed in purely financial terms. Insufficient attention is accorded to the development quality of investment. Given an assumed capital/output ratio the invariable emphasis is on additional investment capital. Other potential influences on development activity—such as the mobilization of human effort, the importance of organization and management and the relevance of appropriate technology tend to be assumed away.

The existence of the lag is understandable. It is easier to deal with figures of financial flows than with real resources. Financial flows fit more neatly into mathematical models. Activities such as the mobilization of human effort involve skills that economists do not normally have. Despite the ostensible recognition that there is an important role for the so-called peripheral disciplines, their collaboration has hardly begun to be sought.

The acceptance of development as the main objective side by side with the continued pursuit of growth is unhealthy for the development process and therefore deserves particular attention. The aim of this paper is to make a contribution to the remedy by supporting the notion of a real resource approach to financing development.

Underdevelopment and the Financial Approach

The scenario of underdevelopment and poverty that development activities are intended to transform bears sketching for the sake of perspective. In Sub-Saharan Africa 75% of the population live in rural areas and are engaged mainly in peasant agriculture. Their productivity is low, they have little control over their environment, food tends to be inadequate and of poor nutritive quality, housing is also poor, education and health services are grossly inadequate, underemploy-

*This paper reflects the views of C. P. Cacho and not necessarily those of the World Bank, where he is employed. A fuller version will include quotable references, other supporting information, and acknowledgments.

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ment is rife, there is little infrastructure, and in many countries there is a growing population pressure on agricultural land. Another 10% of the population live in urban slums in which the poverty created by unemployment and underemployment, makes the quality of life little different from that in the rural areas. The remaining 15% are relatively more affluent urban dwellers engaged in industry, commerce, government and other services.

The crucial question which such a situation might be expected to invoke is—"What actions are required to raise the level of welfare of the poorest 85% as quickly as possible?" However, in many development plans and in the economic literature the question more frequently posed is—"How much investment—in financial terms—is required to achieve a satisfactory growth rate?" In such discussions, on the assumption of a "satisfactory" rate of growth for the economy, a "reasonable" time frame, and a "plausible" capital/ output ratio, the calculations invariably reveal that the capital requirement is beyond the reasonable expectation of the level of financial savings of the better-off 15%, plus a "reasonable" level of foreign capital inflows—all usually on the basis of existing practices and institutions. The result of this exercise is to settle for a lower than satisfactory growth rate. In terms of real development activity, this calls for a few private ventures and a few public projects in various fields, but always too few in number and too narrow in coverage of physical area and people to make more than a negligible impact on the welfare of the vast majority of the 85%. For them life continues very much unchanged, or may indeed deteriorate in relative terms.

Underdevelopment and the Real Resources Approach

This paper suggests that if the question were "What real resources are mobilizable to bring about social transformation in the shortest possible time?" the context within which a reply is sought would be greatly expanded. The shift of emphasis from financial to real resources is not a semantic one. To think in terms of real resources is to move from the macro-financial confines of the practice of the Harrod/Domar model, into a framework which allows a wider range of possibilities and opportunities for development. The main additional components to be explored are non-financial resources, the efficiency of use of real resources, and policies which minimize the call on limited financial resources. Due attention is also being given to the mobilization of financial savings from conventional sources, for the sake of symmetry as well as to air certain issues concerned with efficiency in the mobilization and allocation of financial resources.

Non-Financial Resources

Perhaps the most pressing development needs of the rural poor—the 75%—are higher agricultural productivity, roads, education and health services. There is a sizeable amount of untapped resources among rural peoples and in other sections of the society which could be mobilized to contribute to meeting these needs. Whether the opportunity cost of rural labor is zero, positive or even negative, has been the subject of academic discussion for many years. Those who have lived in and understand the rural environment know that, given the prevailing technology, large numbers of man, woman and child hours outside the time required for the traditional chores of sowing, reaping, repairing huts and tools, are available for community projects such as building roads, schools and health centers, and digging wells. The argument that this potential effort is not available because of preference of leisure is merely a convenient ploy to fit the situation into our theoretical framework. We have learnt rather belatedly that the rural African responds positively to price incentives—that he is no less rational a social being that his western counterpart. By the same token he will respond positively by contributing effort to build rural infrastructure provided he is convinced that he and his family will benefit from the fruits of that effort.

There are examples in the few countries that have tried this pattern, of how the real resources embodied in schooled youth and community effort can be effectively mobilized to educate the rural masses, and im-

prove public health. Where necessary, learning is imparted by high school youth under the shade of trees rather than await the highly unlikely availability of finance to establish teacher training college, pay trained teachers, and establish rural schools.

The village young man or woman could, with a fraction of the cooperating financial resources required by existing institutional standards, be transformed into a farm demonstrator, "bare-footed-type" doctor, or midwife who in turn can help transform the village society. When rural peoples are convinced of the benefits of these activities, they will supply the supporting real resources by increasing savings through reduced consumption, increased output, or running down stocks, to help pay for the services of these and other agents of change.

Value for Money

The real resources approach is oriented towards first expanding the effective development coverage of available financial resources before turning to additional financing. It recognizes that discussion of the needs of finance for development is as much a concern for getting more development per existing dollar, as with finding more dollars for development. Indeed it makes more economic sense to achieve given development ends by a more rational use of existing financial resources before seeking additional resources. Brief visits to many Sub-Saharan countries and a cursory reading of their budgets reveal ample opportunities for savings through more rational spending. A few examples will illustrate this.

Many more schools could be bult without loss of nesessary practical durability and functional efficiency if the unnecessarily high building standards were made more realistic. Many more miles of farm-to-market roads could be built if fewer underutilized highways were constructed. Many more rural health centers could be built and operated if there was less emphasis on monumental hospitals with high operating costs in the urban areas.

Another category of activity with potential for releasing substantial funds for development comprises the usually deficit-ridden airline and the military. In some countries larger amounts are devoted to military activities than to the capital budget of the state. How much is enough for internal security and defense is clearly a delicate national matter, but is nevertheless worth exploring in any practical search for additional financial resources for development, particularly in the severe resources situation of Sub-Sahara Africa.

Yet another area where the development benefit from available finance may be vastly increased, is the more rational deployment or regional allocation of resources. Earlier, it was indicated that about 75% of the development problem is in the rural areas yet inordinately large shares of resources are devoted instead to the urban areas. For example, in one country for which figures are easily available, some 70% of the entire established civil service and 53% of the established staff in agriculture are stationed in the metropolitan area which has only 10% of the population. In another, the capital city—with 4% of the population—has an overcapacity of hospital beds despite the negligible supply of health facilities where 90% of the population live. While the extent of this inverse relationship between allocation of resources and the size of the development problem deserves study, the tendency is clear. A much greater contribution could be made towards the achievement of development as an objective, by merely redressing the balance of regional resource allocation.

Some Issues in Mobilizing Financial Resources

A. *Internal*

Apart from external capital inflows to be discussed below, the only sure way to increase financial resources in real terms for development purposes, is to increase savings—that is, to consume less from current production and/or increases in future production in the monetized sector. It is also possible to do so by increasing the money supply. Here, however, success depends on the capability to implement measures which constrain the additional demand from becoming inflationary and from unduly raising imports particularly of consumer goods. This calls for a level of economic management that is yet to be at-

tained in Sub-Sahara Africa, and should not be attempted until the required capability is acquired.

The more rapid the rate of increase in monetized output the smaller the required sacrifice in consumption foregone relative to the increase in savings. Initially, in the assumed closed economy situation, given an agreed reduction of consumption, savings and therefore finance for development will be increased through raising output by using existing factors of production more efficiently. Better organization and management, more highly motivated extension work, improved marketing, a pricing system which does not tend to discriminate against, and therefore act as a disincentive to the farmer, are examples of efficiency measures that might be employed. As savings increase, the process becomes cumulative and higher levels of finance become available for development.

The real resource approach is as concerned with who saves as with aggregate savings, because to some extent the use to which savings are applied—that is, the development quality of investment, may depend on who does the saving. For this purpose it is usual to identify three categories of savers—the public sector, business and individuals.

Detailed information about income distribution and the savings profile in Sub- Sahara Africa is so inadequate and unreliable that some of the following judgments derived therefrom may be little more than conjectural. On the basis of the accepted saving behavior of various income groups, there should be economic merit in the existing skewed distribution of *personal incomes.* However, the proneness of the medium to upper income groups for high consumption particularly of imported goods, may mean that the skewness of the income distribution results in not only a low savings ratio but also a high demand for imports of consumption goods. If this is so, then the answer to increased savings from individual incomes may lie in making it attractive for individuals to save through financial intermediaries by the lure of incentives such as higher interest rates. This method is likely to be successful however, only up to the point where individuals are sensitive to interest rates that do not make the concomitant cost of lending a constraint on development-oriented investment. If the response to reasonable savings incentive is inadequate, then portions of the incomes of high income individuals have to be taxed away by government and made available directly for public or for private investment through financial intermediaries. In doing so, care must be taken not to exceed the level of taxation above which disincentive to effort begins to occur.

Fiscal means are available to extract savings from lower income individuals also. For example, some countries have introduced an agricultural income tax to which even peasant farmers are liable. The other main instruments for raising the level of savings of individuals as a group, are institutional and incentive. A country like Ethiopia with a geographically fairly widespread banking network illustrates how by making financial intermediation available, a sizeable potential for individual savings, even in poor rural areas, may be tapped. The bank-type institution can of course by supplemented by non-bank bodies such as cooperatives, credit unions, and savings clubs. The institutions provide security and convenience but may need to do more by way of offering a return that compensates for inflation and for deferring consumption.

Finally, direct individual savings/investment may be encouraged by facilitating the availability of capital inputs as catalysts to call forth counterpart funds and effort from individuals. Examples of this type of catalyst are sites and services in urban areas on which houses may be built on a self-help basis, and the availability of plants and other materials for soil conservation in agricultural areas.

Private Business savings depend on distributable profits and corporate distribution policy. Operational efficiency apart, profits may be influenced by government pricing and taxing policies. Given production costs and capacity, price control— which implicitly means control below market price—squeezes profits. In the same way, some tax remissions reduce costs and help increase profits. The fiscal instrument may also influence business savings through its effect on

distribution. This is achievable by making corporate taxation discriminate against distributed profits.

Business savings invariably do not always flow into financial intermediaries. They are often ploughed back or invested in other lines of business. On the assumption that businessmen are profit maximizers, business savings are optimally used by businessmen in purely growth sense. If optimal business use and development ends coincide, well and good. But they may not. Savings may be used to automate operations with inordinately high net social costs in terms of displacing labor without adding much to productivity. Also, there is ample evidence that businessmen may seek to maximize egos rather than profits, and to that end may indulge in what in effect is corporate consumption disguised as corporate investment.

In countries that believe in private enterprise as an instrument of development, profits and corporate discretion in the use of corporate savings are integral parts of the system. Where these are in conflict with development objectives, then it is for the government to intervene as far as practicable to divert the flow of business savings into more development–oriented purposes. Some of the instruments of intervention have already been discussed.

Direct government involvement in production and trade is so widespread in many countries of Sub-Sahara Africa that the role of the public sector in providing finance for development must be analyzed through its two separate parts–public enterprises and the government proper.

Two features of public enterprises in Sub-Sahara countries are their relative inefficiency, and indecision about whether they are businesses in the normal sense or instruments of income distribution. The effect of both features is to reduce savings in this subsector. This suggests that there is a premium, if only for reasons of increasing contributions to financing development, on improving the efficiency of public enterprises. Indeed, experience suggests that improved efficiency in the subsector needs very much to start from the appraisal of proposals for public enterprises.

Prices which are important determinants of profits and enterprise savings are often centrally determined and in many cases at levels which may vary from below costs to minimally above costs. This is done in the name of keeping prices low for social reasons and of fighting inflation. In many cases it does not achieve the first of the two objectives since the main consumers are the higher income urban dwellers. The extent of the policy's effectiveness in fighting inflation is open to question. Insofar as such pricing policies constrain the availability of financial flows for development, they call for serious review.

The public sector proper is a sizable and rapidly growing consumer but not a particularly significant saver. Government saving, as conventionally calculated, is the balance after deducting recurrent expenditures from current revenues. Current revenues must grow faster than recurrent expenditures if government savings are to increase. Policy instruments may focus on either or both variables depending on the savings effect desired and of course on the impact of fiscal policy on the rest of the economy. Government savings may be used directly to finance development projects or, as indicated earlier, they may in part be channelled into financial intermediaries for on-lending for development purposes.

Recurrent expenditures have grown rapidly in Sub-Sahara countries in recent years. But before adopting policies for controlling recurrent expenditures in the effort to increase government savings, some definitional problems should first be settled.

The main components of recurrent expenditure as defined in country budgets are administration, defense and internal security, health, education, agriculture, other productive sectors (e.g. industry and tourism) and infrastructure. The prevalence of underemployment in the public service gives the impression, at first glance, that savings may be available by reducing expenditures on administration. On further reflection it is not so clear whether administration is unnecessarily large or whether the problem is one of inefficient

organization, management, and motivation. This requires study. Defense and internal security were discussed above. The amounts spent on these activities are so large and growing so rapidly, that they need at least to be kept in view in formulating policies for control of recurrent expenditures. While some spending on health, education and agriculture are of a recurrent nature and may give way to raising savings, many elements such as aspects of preventive medicine which directly affect productivity, vocational training, and agricultural extension, are investments and must not only be spared if there are cuts in recurrent expenditures but should be recategorized and considered for increased allocations. The observation is that although expenditures on infrastructure, especially roads, may be increasing, the rate is too slow to satisfy the requirement for maintaining existing assets. This results in inadequate maintenance and leads to the wasteful consumption of capital. A thorough review of the situation might well commend infrastructure maintenance for increased financial allocations.

In summary, there is probably room in recurrent expenditure budgets to squeeze increased savings for development purposes, but this should only be done after a detailed and thorough study and analysis of recurrent expenditures.

Raising the contribution of the public sector to finance development by *increasing revenues*, may be achieved through improving taxpayer responsibility, improving the efficiency of the taxing and collecting machinery, raising the rates of taxes and charges, instituting new taxes and charges, and broadening the tax base.

Large amounts of the taxes payable on the basis of existing laws are not being collected largely because the habit of and responsibility for paying taxes have not yet become established custom. Insofar as this is so, the problem may be attacked through propaganda and education. It may also be tackled by improving the efficiency of the revenue machinery. Not infrequently, however, the deliquents belong to the power elite and their failure to pay taxes is deliberate. Where this exists the tax burden tends to be shifted on to those less able to pay and further skews income distribution. Available studies of tax effort indicate that there is room for improved efforts in many Sub-Saharan countries. But apart from plans to increase taxes and charges and institute new ones, the efficiency of the measures and their implications for the rest of the economy should always be fully thought through and taken into account.

Finally, government, like the private sector, may help to develop or take advantage of local capital markets to borrow for development purposes by issuing bonds. As yet capital markets including financial intermediation are largely underdeveloped in Sub-Saharan countries. As the export of insurance premiums, profits and other outflows are increasingly restricted, the development of capital markets as instruments for mobilizing additional resources for development, assumes growing importance particularly in countries which are committed to largely mixed economies.

B. *External*

The extent to which resort is made to foreign capital for grants, loans, and equity financing for development, is mainly a function of success in earning foreign exchange and of the management of such earnings. Foreign exchange expended on consumption, is clearly not available for capital goods for development. The fact that exotic and expensive foreign cars and other evidence of imported luxury consumer goods abound in Sub-Saharan Africa is ample evidence of the need for more responsible management of external reserves in the interest of development. The all too frequent disregard for local resource availabilities in importing capital intensive technology where labor intensive techniques are both technically and economically feasible, provides further supporting evidence. Such wasteful use of external reserves reduces what is available for development.

While there are opportunities for increasing external financing for development through improved management of resource use, greater possibilities are to be found in

increasing exports. Where there are no commodity agreements restricting output and sale, the usually prevailing conditions of perfectly elastic demand suggest that policy should be geared to raising and diversifying production for export. This calls, among other measures, for higher priority for research particularly in agriculture, and for increased efforts to export resource-based products in more processed form. Turning to diversification, it is highly probable that entering into or developing non-traditional exports particularly of manufactured goods may be more demanding of productive efficiency and competitiveness than traditional exports. Diversifying exports to increase foreign exchange for development, therefore seems to require a review of policies of protection and concessions behind which inefficient industries tend to be established. Ostensibly a purpose of such undertakings is import substitution, but at times they are high in import content and low in value added and employment generation. An inefficient industrial sector is hardly the setting for producing competitively for export. Of course operations that qualify on realistic infant industry and similar grounds should be encouraged. The many infants with negligible potential for growing up are a constraint on export diversification.

The development needs of Sub-Saharan countries in terms of both capital and "know-how" are so enormous that, however effective the countries' own efforts, there is always room for foreign participation to help accelerate the pace of attaining development objectives. With few exceptions however, external participation has costs—economic and political. Capital flows are worthwhile only if the benefits they create exceed these costs. This is not always evident in arrangements for foreign participation.

The export prospects of most countries are such that they should seek capital inflows on the most concessionary terms available. This implies terms that include grants and loans with low interest, long grace period, long repayment period, and no ties. The condition of "non-tied" financing is crucial for the real resources approach to financing development. What matters is not the amount of the capital flow but the appropriateness of the real resource underlying the flow in terms of economy, suitability and overall development quality. At times the equipment and the type of skill that the supplying country may want to provide may be wholly inappropriate and uneconomic. This must be resisted. Suppliers' credits are becoming a growing feature of foreign borrowing. The emphasis on concessionality suggests that this type of borrowing, which is usually short-term and carries high interest rates, should only be transacted as a very last resort. Suppliers' credits tend to raise the debt burden, adversely affect flexibility of management by their demands on external reserves and impair the country's credit worthiness.

In a mixed economy there should be room for the participation of foreign entrepreneurship, management, "know-how" and capital. Undoubtedly they can make significant contributions to development, but they may also have high costs. These include costly concessions, inappropriate technology, and foreign exchange requirements to repatriate capital and pay interest dividends, salaries and other costs abroad. As with public capital flows the net benefit criterion does not always but should be made to be the determinant of whether foreign participation is desirable.

Portents for Planning

Planning as presently practiced in Sub-Saharan Africa, derives from the narrow macro-economic framework which in part has its roots in growth as the objective. As such it has severe deficiencies as an instrument for attaining broadly-based development, and is an inadequate vehicle for putting the real resources approach into effect.

Current practice excludes the whole area of available human effort embodied in surplus rural labor and the adolescent school population, which could make a sizable impact on underdevelopment. An appropriate widening of the framework would require a number of changes. Such skills as sociology and systems management would need to be added to the planning organization. The pattern of highly centralized planning would have to give way

to some decentralization to enable the participation of rural communities that is so essential to the mobilization of their effort. The concept of planning as an activity for a few technocrats, mainly economists, whose main function seems to be to recommend prescriptions from the capital city, would have to be broadened to include involvement in the plan implementation process. The important role of political leadership would require a much more active participation of political leaders throughout the entire planning cycle.

At present, the objectives to be achieved by planning tend to be couched in rather general terms of which the most important is usually the growth rate. These general terms are invariably not broken down into tangible targets such as amount of increase in yield and/or total production of each crop by region, the increase in the number of functional literates, and the number of miles of feeder roads to be built by region. The real resource approach suggests a need for these detailed targets and the minitoring of their achievement. Work in the field of statistics for planning would have to be organized to deal with these kinds of information. Planners' awareness of the development quality of resource use would need to be heightened, and priorities would require reordering to focus more on the essential development problems.

Finally, the narrower field of economic management within the overall planning framework calls for more attention and greater cooperation between central planning organ, finance ministry and monetary authority, than seem to exist at present.

Conclusion

This paper is directed at practitioners—that is, at political leaders and bureaucrats involved with the problem of planning and mobilizing resources to improve the condition of life of the 85% as far across the broad as practicable and in the shortest possible time. The present approach with its emphasis on financial flows and little apparent concern for the quality of resource use evidenced for example, by the prevalent inverse ratio of resource concentration to development problem, is unlikely to do more for poverty in the future than it is doing at present—making at best a marginal impact. In some countries the number of persons affected by total investment each year may be less than the addition to the population. The real resource approach is one hope for snatching even a small gain from what in many cases is a losing fight against human misery. The approach is demanding on leadership, discipline, sacrifice, and qualities to mobilize human effort. Insofar as there may be soft states in the region, it may not be generally applicable. Where the coditions and attitudes are appropriate, it may be well-worth trying. The experience of Somalia, while probably not exactly replicable elsewhere, is an example of what may be achievable.

INSTITUTION BUILDING AND PLANNING, WITH EMPHASIS ON PLANNING ORGANIZATIONS

BY
W. W. MCPHERSON*

In this discussion I shall draw heavily from direct experiences in the development of Pakistan's first five-year plan, personal observations of, but not direct participation in, development planning in several of the Caribbean and Latin American nations, and from extensive readings and discussions with numerous individuals. I have not had direct experience in Africa. Although no two nations are alike, I believe that there is a set of relatively common characteristics and coditions among many nations that can provide the basis for fruitful consideration of development planning problems. One of these features is a low level of organizational and administrative capability.

Our topic for discussion is an extremely important one. During the early stages of de-

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velopment planning in Pakistan, it was concluded that the limitations on the economic growth rate would not be labor, natural resources, capital, nor financial capability; the primary constraint would be the organizational and administrative capability (Govt. of Pakistan, 1957, pp. 91-92). Subsequent observations have led me to believe that this condition is a rather general one.

Another indication of the importance of our topic is the fact that nearly every country is engaged in development planning, although the planning process in some countries may be little more than annual budgeting of government revenues and expenditures (IBRD, 1973). Before moving to a direct discussion of matters pertaining to organizations for development planning, it will be helpful to discuss the nature and role of planning and the types of work to be performed. Development planning must be considered as an essential part of a continuous process that includes the selection of objectives and policies, program development, implementation, and continuous evaluation of progress and revision of goals and programs.

For purposes of discussing development planning, I make a distinction between economic growth and economic development. According to Schumpeter (1947, p.2), economic growth occurs during any period when "... the trend values of an index of per capita total output of goods and services have increased during the period." Lewis, in his *Theory of Economic Growth* (1955, p.9), stated that "The subject matter of this book is growth of output per head of population... The definition must, however, relate to goods and services– 'economic' output, in the old fashioned meaning of 'economic'–and not to some such concept as welfare, satisfaction or happiness." Thus economic growth is defined as a sustained or trend increase (not increases due to seasonal, cyclical, or random variations) in the real value of goods and services per capita; i.e. real income divided by population. Economic growth in these terms is a basic objective in nearly all development plans (Waterston, 1969, pp. 144-50). But in recent years the personal distribution of income is involved also, and a common objective is that masses of the people in the lower income groups should share in the income growth.

I shall now consider the concept of economic development. The real income generated in relation to population depends upon the quantity and productivity of the inputs; i.e., Real income/population = F (H,C,N), where H, C, and N are human, capital, and natural resource inputs, respectively. Economic development then refers to the development of these resources and organizing them in a way that will produce economic growth. The distribution of income will be determined by the institutional arrangements as well as the productivity of the inputs. The objectives of development planning, then, are to provide policies and programs that will bring about continuous increases in the coefficients of the inputs to accelerate income growth and that will create the structural arrangements to produce the desired changes in income distribution and social relationships. The key factor in the development process is the human element, for it is the human element that is the dynamic decision making factor that develops natural and capital resources as well as the human factor itself.

By what means is development planning supposed to contribute to economic development and growth? According to Tinbergen (1958, pp. 3-4), "...economic development may be furthered by what may be called a 'development policy'.... This development policy would have four principal objectives:

(i) to create the general conditions favorable to development;

(ii) to acquaint the government itself, the business community, and the public generally with the potentialities and advantages of development;

(iii) to make a number of investments, usually of the 'basic' type;

(iv) to take measures designed to facilitate and to stimulate private activity and investment."

There are other, or possibly more specific, purposes for development planning.

A large share of the savings is managed through the government sector. Regardless of the feelings toward the roles of the government versus the private sector, as a minimum the government will need to play major roles in the fiscal and monetary programs, in all phases of education and research, in transportation, communication, information services, and in other programs that deal with the infrastructure. This role means that the government must play more than a passive role of allocating resources, it must also generate resources to be allocated. A comprehensive plan provides a general framework within which individual project proposals can be evaluated more effectively in relation to alternative projects in terms of their contributions to multiple, and sometimes conflicting, objectives of the nation. This matter has been encouraged or required by international financial agencies since the early 1960's. Thus it probably is not a coincidence that most of the Latin American nations reorganized old or established new planning organizations around 1962-1964. The quantitative features of a plan provide the means of testing for consistency between such items as programmed inputs and outputs in total and among interdependent industries and sectors, between resources available and those required, and between programmed production and demand for consumer goods.

There is no one form of organization nor is there any one structure in the government system that is likely to be most appropriate for all countries at all times. However, there are several matters that should be taken into consideration in each case. The general goals and policies must be politically acceptable and should be known early in the planning process. Thus the top authorities in the government structure should participate in the formulation of general goals and policies. Although the power to accept and reject goals and general policies must necessarily rest with the top authorities in the government structure, a professional planning staff can provide valuable assistance. Too frequently, the initial formulation of goals and policies reflect "needs" and "ideals". A professional planning staff can assist in reducing the goals and policies to more realistic levels by pointing out conflicting goals, by indicating the overall production and distribution capabilities, and by insuring that the matter of administrative feasibility is considered.

To perform effectively, the planning unit must be placed in a position in government where it will have a high status level and authority. Economic development is a long-term operation. For this reason it is essential that the planning unit have stability in order that continuity may be maintained in the planning process. Yet, the unit should be sufficiently flexible to respond to change, including adverse changes that may occur suddenly.

Another important matter for consideration is to organize the planning unit in a way that will use a very scarce element, i.e., professional planning staff, most effectively. Also, the planning unit must be able to attract and hold top level professional staff.

Development planning, even in its simplest form, is a complex operation and involves many units and levels in government and in the private sector. Thus coordination and cooperation are quite necessary. The means of facilitating this coordination and cooperation is something that merits very serious consideration when one is considering the matters of organizing a planning unit and where, within the structure of government, it should be placed.

Most development planning units contain, and there is need for, an executive body and a professional staff. According to Martin (1971, p. 95),

> In a parliamentary system the policy decisions are usually made by a cabinet committee composed of ministers, often with the Prime Minister in the chair, and by the President in a presidential system. Such a committee consists of the whole cabinet or the heads of those ministries which are responsible for implementing the policy recommendations. . . . Below the cabinet committee there is a central planning agency responsible for the overall

formulation and review of implementation of the plan.

I would add that the executive group in many countries also includes heads of other agencies, such as the central bank, and representatives of various groups in the private sector, such as the coffee, sugar, and other industries.

A major advantage of an executive body of the type described above is that the major policy making and action implementation bodies are represented. It stands high in status and authority. However, such a group may become exceedingly large and decision making may by very cumbersome and slow. It includes persons whose priorities on time may be given to other matters. In such cases persons hold their positions on the executive planning body as a result of their primary position—not as a result of their interest or capabilities in development planning. Moreover, in many countries this form of organization may be very unstable, because of frequent changes in government, as well as inflexible because of major interest in their primary position.

When Pakistan established its planning organization in 1953 to develop its first five-year plan, the executive body was set up outside the routine government system and reported directly to the Prime Minister. It consisted of a Chairman and two members, one from West Pakistan and one from East Pakistan in order that two major political interests would be represented. Although the Planning Board was responsible to the Prime Minister, for planning purposes, for planning purposes, it was established as a temporary organization and for administration was attached to the Central Ministry of Economic Affairs. Staffing was still subject to most of the routine government regulations, including salary levels. "The salaries which the Board offered well-trained candidates without seniority were not high enough to compete with either private industry or other alternative employees and attempts to get the Ministry of Finance to approve higher salaries met with little success" [Waterston, 1963, p.22]. One source of staff was to acquire them on lean from other government positions. The Chairman of the Board was a senior civil servant who commanded extensive respect as a result of his very able professional capabilities. In addition to pre-partition civil service he had served as Governor of the State Bank of Pakistan and had been of Pakistan and had been most influential in establishing a relatively efficient central banking system in a very short period. "From the time the Planning Board was established in July 1953 until October 1958, when the military took charge, Pakistan had five Prime Ministers. None was ever in secure control of Government" [Waterston, 1963, p. 50].

Under the above circumstances of high levels of instability and uncertainty in government, unclear ties as to responsibility and authority between the planning organization and other units of government, a relatively continuous planning operation was carried out, although there were delays due particularly to problems of staffing, and cooperation and coordination horizontally and vertically among units of government. Also, implementation was interrupted frequently and lagged far behind schedules. I doubt that the planning operation would have been equally effective if it had been set up within any existing unit of government.

Usually, when the planning unit is placed within an existing unit of government, it is located in the ministry that is responsible for the routine budgeting function. The justifications for this location are that it tends to minimize the additional staff required, it is most likely to have the better trained staff, it is likely to carry the highest level of status and authority, and it minimizes the problem of separating development from routine budgets. However, according to Waterston [1969, p. 490],

> The most important argument against putting a planning office in a ministry of finance is that a planning agency's approach to development is fundamentally different from that of a ministry of finance. Rather both approaches are useful and necessary. It is true that a minister of finance

must be a friend of a central planning agency if a plan is to be coordinated with the budget, but this does not make it necessary or desirable that he be its boss!

A number of countries have established planning units as a new and an additional ministry in order to separate the planning unit from the traditional system of government, but, as indicated by Waterston [1969, p. 490], planning ministries have not proved to be successful because other ministers were not willing to grant a new minister of equal rank authority over their own affairs. In a number of cases that I have observed it appeared that the original ministers viewed the new arrangement as just another obstacle to be overcome in the decision making process.

Another possibility is to establish the planning agency as an autonomous agency outside the regular government system. But, again as Waterston [1969, p. 489] had indicated, and I agree with his observations, "A planning agency must be a government body if it is to express government policy.... experience shows that the establishment of an independent planning agency often leads to its isolation from the rest of government, confusion of responsibility, unproductive rivalry and wasteful duplication."

At this point I shall indicate what I would suggest as the minimum role of a planning staff and how it might be structured into the system of government in a "typical" situation. The central planning staff should consist of the necessary number of persons with qualifications to prepare working papers on the major policy issues, assist the executive planning body in formulation of goals, provide the general framework for sector program development, to synthysize sector programs by insuring consistency among sectors and between goals and proposed programs, insure consistency between resources available and demands for resources, and to evaluate progress and determine appropriate actions to overcome barriers to progress. This staff should be located as a special unit outside the regular structure of government and should report to the executive body of the planning organization.

Detailed project and program development should be done by those organizations that will be implementing the development programs. In this arrangement, there is a lack of direct control by the central unit. On the other hand it may make more effective use of scarce professional personnel, reduce duplication and insure that those who are responsible for action will participate in the planning operations. Thus those who are responsible for action should develop a more intimate knowledge of what is to be done and are likely to be more cooperative in the implementation phase than would be the case where they are asked to implement a program that someone else has developed. Modification of the above suggestions can be made when justified by differences in individual situations.

In agriculture, if a program is to be effective, it must influence the decisions of thousands or even millions of farmers. A most difficult problem is how to structure the development agencies down to the village and farm level. In view of our limited time, I shall not go into this matter here but shall close by highly recommending the reading of material previously prepared by Green [1968, pp. 267-302] on the subject of "Organization for Local Development in Low-Income Countries."

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PLANNING ECONOMICS DEVELOPMENT AND THE ROLE OF INSTITUTIONS

BY

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I. INTRODUCTION

Sir W. Arthur Lewis wrote two and one-half decades ago: "The truth is that we are all planners now."[1] Since then our experience with planning throughout the world has had a rather sobering effect on us as we have experienced numerous frustrations and even failures. These experiences with planning and the Development Decade that was not have caused us to be more reflective and have prompted writers to evaluate our experiences in a number of articles and books.[2] Despite setbacks in planned development, it is still the case that throughout the world there is a continuing committment to planning for achieving economic development. In many ways these experiences make planning more essential than before, for the urgency of our need to raise the standard of living for millions persists.

What economists and others should have said in response to Lewis' statement was: "Yes, we are committed to planning as the path to more rapid economic development, but do we know *how to plan*?" This question is generally answered in the affirmative without many qualms, based primarily on our response to war-time preparations and rebuilding war-torn countries. Unfortunately, the majority of the skeptics were ideologically opposed to planning; and, therefore, advocates of planning tended to dismiss their critics' skepticism as being solely based on ideological and political opposition to socialism or other such "revolutionary" ideas.

Twenty-five years, hundreds of failures and frustrations and billions of dollars later, we are still facing the issue of whether planning is needed to achieve rapid economic development. The question we must ask ourselves at this Conference is: "Given our experiences over the past twenty-five years, are we *now* better planners?"

We are not prepared to give an unequivocal answer to this query, but we do want to *suggest strongly* that a major hope for improved, successful planning lies in improving our understanding of the roles of institutions in the processes of development and planning. This means we must broaden our concern from a narrow consideration of capital/output ratios, capital and human investment, shadow prices, input-output tables, and other technocratic concepts. Now we wish to emphasize that our concern is not that economists must become sociologists, psychologists, political scientists or any other kind of social scientist. Economists already have the analysis capable of a fuller understanding of the processes of planning and development. We must pay more attention to how economies work, i.e., concern ourselves with the working of economic institutions and structure. Sociologists and political scientists have long considered institutions vital, but their concerns have tended to be a bit too philosophical or metaphysical to be of much use to economists.[3] Understanding the social, psychological, political, or religious significance of institutions can be interesting and important for the economist. However, unless he comprehends the economic implications of these facets, he is no better an economic planner or policy maker with this knowledge than without it. Economists are to remain economist. They are virtually useless as sociologists or political scientists. They must become better economists by breaking away from narrowly-conceived technocratic concerns when they are concerned with economic progress in less developed countries.

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II. On the Nature of Planning In Less-Developed Economies

There have been numerous writers who have written on the nature and purposes of planning.[4] In general, planning is a complex and many faceted phenomenon. In essence, it can be looked upon as a machinery for systematically selecting the best alternatives to achieve specific goals. This machinery is a decision making instrument designed to establish a relationship between means and ends with the object of achieving the latter by the most effective use of the former.[5] The purposes to which this machinery is put are many. They range from the preparation and execution of a single program to the management of a region or a nation. There is also some variety with respect to the time perspective in which the planning process can operate: it can be temporary to meet the likes of an emergency situation; or it can be long-lasting as in the case of national planning for economic growth and stability, full employment or economic development.

Our concern here is with economic planning in general and development planning in particular. Experience with planning in less developed countries (LDC's) has brought new information about the structural problems of such economies. In the light of this new experience, a reappraisal of past and current approaches to development planning seems in order. This reappraisal is likely to call into question the underlying assumptions of past approaches and result in a narrowing of the gap between the theory and practice of planning. This can only be done, if care is taken, to develop a planning mechanism that is sensitive to the conditions in the environment in which it is to apply.

Experience has taught us that it is important to make a distinction between anti-cyclical planning, which is related to stabilization policy in developed countries, and development planning which concerns the restructuring process in LDC's. This distinction reflects a difference in kind, and the planning seeks to achieve full employment of resources and social and economic progress through the existing institutional framework of society. In developed countries where this type of planning is practiced, the institutional structure in both the private and public sectors is already in place and is generally more suitable for dealing with the kind of adjustment problems that arise. Development planning deals with economies which are beset by a variety of problems. Many of these problems can be traced to fundamental structural imbalances such as under-employed and unemployed resources, balance of payments difficulties and a variety of bottlenecks which tend to impede production and distribution. More importantly, the institutional infrastructure which is required to provide the intersectoral linkages, for the most part, is lacking. If it is established, the infrastructure tends to be either inappropriately operated or inappropriate for the environment.

These fundamental defects of the socio-political and economic environments of LDC's make it mandatory that fundamental structural changes be considered as a necessary part of the process of development. They explain, in part, why many governments in LDC's refrain from allowing the market to allocate resources. They also explain why governments, one after another, have turned to economic planning to attain what they have conceived as desirable social and economic goals—the transformation of institutional arrangements considered inimical to the expansion of productive forces and the establishment of a more equitable and balanced society.

Many economists feel that there is a crisis in planning and a lot of time and resources are being spent on efforts to develop new planning techniques. While new techniques and approaches may enhance the efficiency of the planning process, there seems to be a more urgent need for planning experts to bring their theories and techniques down to earth. By being less oblivious, especially at the formulation and implementation stages of their plans, the appropriate institutional infrastructure must exist before a plan can be efficiently implemented. In a real sense, the planning process can be likened to an umbilical cord that ties the institutional infrastructure to the environmental changes which constitute development. In the process of conven-

tional planning the umbilical cord is severed, and the planning is done, for the most part, in a vacuum where planners' preferences for internal consistency supersedes the need for practicality and feasibility to such an extent that in some countries economic planning presses on without adequate attention to social, political, spatial and ecological aspects of the choices being made.

One conclusion seems inescapable: the objectives found in traditional plans are often inappropriate for solving social problems. That is why Waterson[6] has suggested an alternative approach to planning that focuses on planning from below as against planning from above which is characteristic of the conventional approach. This alternative approach has a built-up mechanism for identifying and solving the problems inherent in the social situation. Lack of such a mechanism makes it difficult to connect objectives and targets to basic social problems in need of solutions. Rather than face the basic social problems directly and work out the appropriate strategy and institutional arrangements for their solution, the conventional planner approaches the solution in a roundabout way. It might well be a simple matter to determine analytically how fast the GNP must grow in order to raise per capita income by a given percentage, but a much more complex matter to work out the interplay of institutions and other critical inputs to bring about the appropriate growth rate and the resulting distribution of the increment. It seems that it is this latter problem that planners would want to solve. The former approach is a classic example of a planning approach in which needs serve planning rather than planning serves needs.

III. Transplanting Institutions: A Theoretical View

Although it has not always been explicitly recognized, the kind and nature of planning utilized crucially depends on one's conceptualization of the process(es) of economic development. Given our state of knowledge of these processes, it is not too surprising that so many of the existent problems with planning remain with us. The emphasis on observing the characteristics of less developed and developed economies has tended to lead economists to focus on determining the unifying (or rather presumed) causal factors. It is a grossly simplified view but still illustrative to note that alternatively, manufacturing, education, technological change, social change, political change, investment, finance, cottage industries, agriculture, mechanization, etc., have been advocated as "the key" element in economic development. Planners were then obliged to plan attainment of these objectives. Time and again plans based on these elements have gone awry. Why?

Economists have often concentrated on the ends and numerical objectification of economic, historical and institutional processes of development rather than the processes themselves.

Having disregarded the historical and institutional natures of economic activities we tend to measure economic progress and development by labor-capital shares and ratios, capital-output ratios, rates of price changes, interest rates, degree of financial intermediation, etc. Viewing economic activity through such a narrow framework has meant that economists have overlooked the possibility that much of what we observe, when we observe developed economies, are the manifestations of much learning-by-doing that has taken place as economic actors have participated with each other in continually evolving economic institutional contexts. Economic historians have generally been aware of this potentiality that economic progress is intimately bound up in the learning by participating and the evolution of new institutional forms to cope with a changing economic, social, or political environment.[7]

Now if learning and evolution takes place during economic participation, this raises the question of whether it is feasible or efficient to "import" economic forms or plan economic development and thereby by-pass, entirely, the experiences that occurred in the now developed economies. The presumption has been, heretofore, that transplantation was not only desirable but also efficient. However, with the evidence we have seen on the failures

in many nations, we must pause to ask why some have succeeded in importing institutions and others have failed miserably. The answers given are usually that the successful importing societies' traditions (political, economic, and social) were similar to, and the unsuccessful ones different from the original society. This is tautological and provides no real understanding of what has happened or is likely to happen. Besides, it is not an obviously correct appraisal of the situation. Economists must determine why and how the differing social and political environs have been disrupted by, and in other cases aided by, the economic forms and organizations that have been transplanted.

Perhaps, the problem stems from our failure to account for the dynamism of economic processes, societies, and institutions. If we look back over history we can see that most of the current editions of economic structures and institutions represent the product of continuing change and modification of several decades or centuries. Transplanting such structures in poor economies that have not experienced any of the kinds of economic stresses and events that led to their development originally is apt to be doomed to failure or, at least, frustration in the new environment. This can result because individuals and institutions in the new surroundings have not had the benefit of the learning or the adaptation that takes place with participation in earlier forms of activity and structures.

The prognosis proffered here is not to be interpreted to mean that transplantation is impossible, nor should it be construed to mean that cultures, traditions, and institutions must be homogeneous if development is to occur. What we wish to emphasize here is that the duplication of existent forms and types of economic structures and activities is not sufficient (and probably not necessary either) for development planning to be successful. Planning aims to telescope decades or even centuries of learning and evolution into a much shorter time period; and the images are likely to become distorted if one is not careful of focusing.

IV. Concepts of Economic Development and The Role of Institutions

Regarding institutions' role in developing, W. Arthur Lewis' *The Theory of Economic Growth*[8], perhaps, remains the most definitive treatment of the general outline of the roles institutions play in development. Most of the work in this area has been done by sociologists and political scientists, with some recent work being done by agricultural economists.[9] The economists who have dealt with this problem on an analytical level are generally "new economic" historians, but at present little headway has been made in the effort to develop a theory general enough for wide use but capable of use in analyzing particular cases.[10] Another key book is that of Powelson[11] in which he develops a theory of institutions built around the assumption that the process of growth and development is principally one of inducing conflicts that must be resolved or managed by institutions. In many respects his theory seems to parallel Hirschman's theory of development[12] built on the concepts of stress inducing and stress relieving as the prime movers. Unfortunately, much of the work in this area often is *ad hoc*, so we have much work remaining before operational analysis is available. Davis and North and Powelson have made some needed progress but their works have far greater implications for the evolution, growth, and development of economic institutions.

V. Institutions in Development and Planning

Vital questions remain as to what the nature and role of institutions are in the development and planning process. The primary issue is probably whether institutions are manifestations of sets of values or coterminous with sets of values. Whether institutions exist apart from some general set of values may offer us the explanation behind the frequent failure of transplanted institutions. If a given institution does not exist, except within a particular value system then transplantation is more difficult and impossible, except if we transplant the underlying value system(s). This view seems ethno-centric and even imperialistic and exploitative because it implies that there is only one true

path to development—that followed by the exporting society. It implies that less developed economies will remain so until they pattern themselves along the lines of developed ones. We reject this conclusion.

By taking an exceedingly narrow and self-serving view of development planning and institutions, developed nations have foreclosed on the notion that indigeneous institutions can and should be developed to achieve development. We have implicitly (and willfully) insisted on duplicating our experiences though admittedly telescoped into a much shorter time period. Given the diversity of circumstances and creativity of mankind, it seems far-fetched that institution and nation-building must copy existent ones. Perhaps, the failure of transplanted institutions is due not to the failure of the recipient societies or the institutional structures being unsuitably inflexible, but rather because advisors have insisted upon maintaining the transplanted institutions intact. Is it not reasonable to expect that since the current institutional form evolved from a dymanic process that they are adaptable?

Institutions have several different capabilities so it is not sufficient to establish them in order to achieve certain objectives. Their capabilities vary from one economic environment to another. They must be given clear direction as to what objectives they are to work toward. For example, banks can foster or hinder economic growth, and markets may facilitate or hinder the spread of trade and competition. The objective of planners and policy mmust be to identify objectives and those institutions which are able to effect the changes desired and then undertake the policies that maximize the likelihood that the institutions' work to those ends.

We have mentioned the dynamism of institutions and their ability to produce changes. However, we now wish to indicate that institutions not only enable or induce changes, institutions may facilitate maintenance of the status quo and, perhaps, this is most often their role. Institutions can be built solely to eliminate change or to preserve an ordering of events and situations that were attained in the absence of institutions.

Just as institutions may serve as the prime movers of economic progress, they may spring from economic progress as well as result in economic progress. The emphasis on institution-building as a means of attaining development can be misplaced if planners come to regard development as the product of the hierarchy of institutions, and therefore, one should not fall into the trap of exclusive advocacy of institution-building as the route to development. Institutions are no more a panacea than capital investment or industrialization or import substitution or modernization of agriculture or social change or political modernization. Perhaps, all of these have a functional role in the development process, but no single one can, by itself, produce development.

VI. Some Concluding Notes on Development Planning and The Role of Institutions

The viability of the process that now constitutes development—or rather modernization or depauperization—depends on deliberate measures on the part of the central authorities. The institutional framework must be put in place and the ground rules for its operation devised.

The interplay between planning, institutions and development can be conveniently illustrated if the discussion is slanted in terms of a particular type of institution such as a credit system. The first issue that can be raised concerns the role of (say) the credit system in a LDC. In the first place, such a system must mobilize and provide for efficient allocation of resources between sectors, between regions, and across income classes. Secondly, it must finance the needs arising from modernization—e.g. industrial development and the concomitant development in the agricultural sector. Thirdly, it must mobilize and disburse the savings that are generated from the overall income growth. Finally, it must play a significant role in the modernization process by broadening the participation of the masses in the various social processes of advancement. In a real sense these are a diverse group of functions and the extent to which credit institutions (especially newly created one) in LDC's can perform them effectively depends on: (1) national commitment of governments to effective and

comprehensive planning; and (2) the availability of the organizational abilities and skilled human resources required to create and nurture the appropriate institutional infrastructure.

The effectiveness of institutions can be measured by the extent to which structural imbalances are eliminated as a result of the development of an institutional infrastructure. Proper planning enhances the institutional infrastructure and depends on it as well. The appropriate kind of infrastructure tends to increase the accessibility of the masses to credit and market facilities. This increased accessibility is an outward and visible sign that the institutional infrastructure is having the desired developmental effect. The existence of this effect means there is a greater likelihood of the optimum use of resources and development of the economy.

It is important to bear in mind that the physical presence of an institution is far from sufficient to achieve the development goals. What is generally needed are appropriate credit policies, reorganization of the agricultural sector, and other structural changes in the economy. These changes in themselves will make the given resources more productive as well as provide a more favorable climate for intersectoral linkages.

VII. Credit Unions as an Example of Institutional Roles in Development in Ghana

In concluding our presentation, we would like to briefly discuss an example of institutional innovation currently being attempted in Ghana. This example illustrates the possibility of making institutional changes in a developing context.

The importance of finance and credit mobilization and development has been long recognized by economists. However, economists have tended to concentrate on replicating financial institutional structures in less developed contexts so that orthodox monetary and credit policies can be practiced without much difficulty. Thus, a major mission often given to newly formed central banks has been to create and develop credit and money capital markets of sufficient breadth and depth to allow for effective open market operations. Recently, past experiences in this area have not been too heartening, for despite genuine continuing efforts most developing nations cannot rely on the use of conventional monetary policies to produce the same qualitative effects as identical policies might effect in a well-developed financial market setting.

Provision of adequate credit facilities and mobilization of the savings of the masses remain a problem and goal in developing nations. One function of planning may be to correct this problem. The high cost of servicing small accounts is often cited as the reason for commercial bankers and even special developmental bankers failing to provide credit to the thousands of small farmers in developing nations' rural areas. The credit union seems to offer some hope for providing adequate credit to farmers at reasonable cost since its cooperative organizational structure internalizes many of the costs of providing credit on a small scale. As with other cooperative ventures, they may offer greater prospects than other forms of organization of credit facilities because they also increase their members' opportunities to learn economic and managerial skills and literacy.

The credit union as a financial institution is concerned with controlling the size, speed, timing, and direction of financial flows. It is this kind of control that is often needed and sought in planning development. Current levels of savings may already be sufficient for the economy or particular sectors, however the credit union can mobilize savings and extend credit so that more efficient usage of the funds is assured. They also can provide training in financial matters to their members and foster a spirit of cooperativeness which is often desirable in the developing and planning contexts.

The successful establishment of credit union in Ghana to mobilize greater savings illustrates the possibility of transplanting institutions from other environments as part of the developmental planning effort. Problems do remain within the credit union movement, but efforts to improve the situation continue. The organizers realize that it is not enough to

establish institutions paralleling those in the U. S. and elsewhere. As is often the case, the new environment may dictate the need for innovational changes in the original operating rules if the transplant is to survive and contribute meaningfully to the developmental effort.

The needs of credit unions differ and one manifestation in Ghana is the fact that rural units have tended to have surpluses while the newer urban units tend to be fully loaned-up. The outcome is that a large volume of savings are lying idle. Part of the problem is that there are no substantial opportunities to invest in short-term credit instruments of businesses or government in Ghana.

Developing economies can ill-afford to have savings lying idly in one sector and shortages developing in others. This kind of fragmentation must be eliminated if development is to proceed smoothly. The Ghana Co-operative Credit Union Association realizes that it must reduce this kind of fragmentation, which results from the highly localized nature of credit unions as normally conceived. One way of dealing with the problem may have been to broaden the membership criteria, but this move might have destroyed the movement by eliminating the personal nature of the unions. Instead, the Association has proposed and organized a rudimentary central banking instituition for credit unions in an effort to facilitate greater integration of the units nationally and to tap un-utilized savings while providing additional income-earning opportunities for members.

The proposed Central Fund is a pioneering effort at institutional innovation, for as John Croteau,[13] a leading authority on credit unions, has argued– "a major shortcoming of the credit union movement has been its failure to form a central banking and regulatory agency." Under the Central Fund arrangement surplus units would be able to make funds available for investment or borrowing through a centralized agency that would manage the funds entrusted to it, with interest to be paid on the funds made available.

The concept of the Central Fund certainly falls short of a complete central bank. However, it may represent a beginning in much the same way that currency and marketing boards paved the way to full-fledged central banks in former colonial areas. At present, there are no concerted plans for the expansion of its functions, but if it proves successful it may eventually be expanded to provide a full range of central banking services to the societies. In its present form, it will create opportunities for the geographical mobilization of idle savings and can serve to integrate the financial aspects of the societies. As the movement itself expands, a greater proportion of the population will participating in the credit market and thereby subjected to money and credit policies of the central government. Funds accumulated by the Central Fund may be used to purchase corporate and government bills and bonds and may thereby provide small savers greater opportunities to earn the higher rates of return that characterize the bills and bonds markets. At present, surplus funds are held idly or are invested in low-yielding savings accounts in commercial banks.

If the Fund's activities are limited to transferring idle funds to deficit areas they will still lead to greater efficiency in the employment of savings since a higher utilization rate can be obtained and funds can flow into geographic areas where real rates of return are highest, since returns would tend to be highest where borrowings were greatest. Economies of scale may also be realized once the larger volume of funds is made available. These gains in efficiency may be mitigated if a ceiling is placed on rates payable. Successful operation of the Fund may lead to real gains in national economic unity by exhibiting the possibility of successful large-scale cooperating among small cooperative bodies.

The creation of "special" purpose development banks and credit facilities have tended to fragment finance and credit markets in an effort to provide credit to those activities in short supply. However, cursory observations suggest the problem of rural credit remains. The credit union movement may provide for rural credit needs of small farmers and the Central Fund can provide geographic integration within the credit union movement

and thereby facilitate more efficient utilization of savings by mobilizing idle funds and increasing the volume of credit available to credit union members. Successful operation of the Fund may eventually lead to a genuine central bank for credit unions which could provide needed backing and stability to the fledgling credit union movement. It is important that guarantees of continued operation of the societies be made and, perhaps, the Central Fund will be what is needed–in Ghana, the U. S. and around the world.

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FOOTNOTES

[1] A. Lewis, *The Principles of Economic Planning.* London, 1949, p. 14.

[2] The most noteable evaluation being that of Waterston and his accociates at the World Bank, *Development Planning: Lesson of Experience,* 1965. See also: Stephen Enke.

[3] We are not implying that sociological and political factors are insignificant. We want to emphasize that economists *qua* economists must study and understand institutions.

[4] See for example, E. S. Mason, *Economic Planning in Underdeveloped Areas* and W. A. Lewis, *Developmental Planning and The Principles of Economic Planning.*

[5] The notion of effictive use implies that economic efficiency as narrowly conceived, i.e., getting the greatest output from the least inputs may not always be the preferred alternative. Concern for the role of institutions and the institutional role of development and growth (i.e., the stimulative effect growth and development has on institution formation and evolution) points up the possibility that input-out ratios may not be the desired measure of the impact of planning.

[6]Waterston, op. cit., p. 27.

[7]See: "Resolving the Three Horned Dilemma," *Finance and Development.*

[8]A. Lewis, *The Theory of Economic Growth.*

[9]See: B. F. Johnston cited in bibliography below and literature noted therein in the the bibliography.

[10]See: Davis and North works cited in bibliography.

[11]See: Powelson cited in bibliography, also Hooley.

[12]See: Hirschman, *Strategy for Development*, (New Haven: Yale), 1965.

[13]See: John Croteau, Book Review of The Credit Union Movement: Origin and Development, 1850–1970. Written by Moody and Fite. . . *Appears in the Journal of Economic Literature*, Vol. 10, No. 4, December 1972, pp. 1236–1237.

POPULATION DECENTRALIZATION AND RURAL DEVELOPMENT PLANNING

BY

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This paper is concerned with research as related to improvements in rural (non-metropolitan) development policies and programs. More specifically, the paper has two major purposes: (1) to describe some informational and methodological requirements for a national approach to estimating policy and program options in non-metropolitan development, and (2) to sketch some research organizational requirements consistent with a national approach.

The U. S. does not have an explicit national development strategy relating to population distribution. Growing commitment of the need for policies and programs on population redistribution offers an opportunity for research– particularly more comprehensive developmental planning, [2,6,9,11]

With respect to the informational and methodological requirements, the focus is on:

1. A broader concept of rural development and rural development planning.
2. Some means to sort and evaluate growth centers and mobility incentives consistent with multiple developmental goals.
3. Some means to estimate the political and economic consequences of policies and programs concerned with concentrating scarce public developmental resources.
4. Some means to develop a common sector and intersectoral methodology acceptable to various discipline and regional considerations.

As related to research organizational issues, the focus is on some means to organize disciplinary and provincial research and public service units to commonly address sector and intersectoral rural policy and program options. An essential requirement for such applied research is a coordinated program of research that minimizes the quantity of fragmented studies that cannot be integrated into a comprehensive planning construct.

Prior to some discussion on each issue, I want to comment on the concepts of rural development planning and population decentralization. Rural development planning is taken to mean–the estimation of future consequences of alternative actions as related to multiple goals of increased production, increased employment and more equitable in-

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come distribution. More explicitly the objective is to maximize net income of an area given scarce public resources conditioned by target levels of employment and equity. Alternately the objective would be to minimize public costs to reach specified development targets in a given area. Further, that such planning requires extensive descriptive efforts, considerable micro-analyses, and a macro-construct within which sub-sector and sector aggregations are possible. The principal benefactors of such models are political decision-makers concerned with policy and program options impacting the market and non-market aspects of rural development.

The emphasis on population decentralization relates to a nation's population policy beyond the concern for means to control the size and rate of population change,[13]. Rather the focus is on that element of population policy concerned with where people live, the geography of economic activities, knowledge of options relating to the difficult political and economic issues of concentrating scarce public rural development resources. Implicit in this focus on population decentralization are issues of pollution (air, water, noise), energy and its conservation in use, efficiency elements of social compensatory programs, etc., [10].

Breadth of Rural Development

The early literature on rural development had an agricultural focus relating to programs for the small farmer, further commercializing of agriculture, means for human retraining and mobility, employment knowledge, and among many other the options,for agricultural factor and product market development.[14] More recently the literature has focused on inadequacies of rural public services, environmental impacts and rural changes, technology change and adoption rates for the small producer, restructuring of the agricultural research emphasis on commercial farms, and increasing concern for land use zoning and regulation, [7,14].

However, with many rural development efforts, the general problems of non- metropolitan areas remain unresolved. Generally the reasons for low success rates were given as uncoordinated governmental efforts, regional authorities with inadequate resources, continued agricultural research emphasis on the commercial farm aspects of the technological transformation, and lagging opportunities for increased outmigration.

Perhaps the low success rates—slow resolve of income, equity and security problems in non-standard metropolitan areas or the low rates of return to vast public resource programs—can be explained by not focusing on the basic issues relating to population redistribution. The emphasis should have been attaining a policy commitment and programs to deliver non-farm income opportunities to the non-metroplitan areas—the Rural Development Act of 1972 was a partial effort to bring such a focus.[7].An emphasis on population distribution brings a focus on alternative settlement patterns for rural space.[6]

To achieve my major gains in non-metropolitan development seems to require a national commitment on population redistribution which in turn is related to difficult planning issues for alternative settlement patterns. To achieve such a national commitment and resulting federal resources is likely to require:

1. Further clarification of the complex relations between urban congestion and rural development.
2. Knowledge of the existence and magnitude of conflicting public programs as well as knowledge of alternatives.
3. Increased knowledge of the net benefits from growth centers—concentrating scarce public developmental resources.
4. Increased knowledge of the benefits and costs of alternative labor, industrial and commerce relocation options.

Some of these issues are directly related to the agricultural sector within a non-metropolitan growth center—high cost rural public delivery systems, fragmented agricultural holdings and farm consolidations, land use planning and zoning, improvements in market structure, water management options,

and a sustained agricultural sector input into viable non-standard metropolitan areas.

Growth Centers

In the eight year old report "The People Left Behind," an important recommendation stated "that multicounty area development districts, each with a present or potential growth center, be established throughout the country," [14]. Many uncoordinated research activities have been associated with such an identification effort but without political impact. The supposition here is that a planned and coordinated effort with such identification as one component could contribute more to a resultant action program.

A central concern in identifying rural growth centers and their hinter-land should be the attitude towards and magnitudes for developmental opportunities– not on the basis of an existing socio-economic problem area. Some criteria to be considered and aggregated could include: goals and attitudes of rural communities towards developmental ends; standards for population density and economic activity mixes consistent with environmental standards; minimum impact on existing levels of political representation; least cost linkage into major transport modes; high potential for a competitive agricultural component; availability or proximity to natural, cultural and recreational opportunities; existing base for educational opportunities; potential for the implementation of energy conservation systems; a location that is politically viable with respect to other regional growth centers; and the capacity for a diverse set of economic activities.

Non-metropolitan areas might be further grouped into those by type of potential such as those with an industrialization, recreational, or agricultural focus. Each type could be a growth center with distinctive characteristics, alternate public infrastructural programs and alternate mobility incentive programs.

Another option would be to develop an indexing system which would weight existing and potential levels of services to industry and commerce, services to population, economic impact on surrounding area, transport linkages, cultural linkages, educational complex, etc., [5]. The emphasis would be on identifying priority locations essential to the consolidation of developmental means.

Within agriculturally focused growth centers some major questions relate to future farm size and structure, alternatives to impact farm consolidations, scope and structure of factor suppliers, and economic conditions for viable product market components. Are there individual and social net benefits from a program of government land ownership and conditioned leases; from concentration of FHA type production, factor or product market loans; or from alternate land use zoning programs?

Another aspect of the growth center focus is commonality of an approach that permits regional and national aggregations. The premise is that any serious non-metropolitan developmental effort requires national commitment–alternatives must be evaluated at that level.

Mobility Incentives

Another important component of a coordinated research effort is the identity, historical description, specification and evaluation of labor and economic activity mobility incentives. It is expected that cost effectiveness of mobility incentives would differ by type of growth center. The experiences in England and Europe also suggest that alternative incentives relating to industrial types and tertiary service type firms must be considered,[9].

Due to the strong vested interests of unions, metropolitan developmental groups and others, it is imperative that analyses in this area be at a national level. Only at the national level is it possible to estimate the probable impact of various sets of existing or new incentives. Also at this level it would be possible to identify and evaluate the redundancies or offsetting effects of existing programs.

In general there are four types of mobility incentives:

1. Industry, commerce and labor incentives
2. Infrastructural grants

3. Direct action in locating governmental services
4. Persuasion and controls on major population centers.

With the major emphasis on bringing jobs to the population, the crucial mobility incentives relate to industry and commerce. In Europe the most effective means have been investment grants ranging from 10 to 40 percent of the capital investment, [9]. Other means were subsidized loans, property and transfer tax relief, and regional development companies with resources to acquire equity in new firms and to make low interest equipment and facility loans.

Labor mobility incentives have taken the form of wage supplements and training grants. In addition, grants have been made to cover transport costs and assist in housing. In the U. S., there are existing programs to provide enhanced employment information, experiments on income maintenance options and efforts to achieve welfare equalization.

Most of the public rural development resources are devoted to infrastructure—roads, water and sewer, education, health, recreation, erosion control, pollution abatement. Some countires have also supported an "advance factory program" or building on speculation, development of industrial parks, accessing for special transportation modes and supporting selected cultural activities. [5,9]

The 1972 Rural Development Act provides for some direct action in locating government offices,[7]. Population redistribution programs in France, Sweden and Italy have relocated governmental agencies, nationalized or state-controlled industries and restructured governmental purchasing systems,[9].

The difficult issues relating to controls on major population centers have been significant components of population redistribution policy. Without an acceptable national policy and program, this important mobility factor is impossible. The means include zoning restraints, licensing systems, direct control—these have only been applied in Paris and London after other mobility programs have proven inadequate.

Some studies have been directed at evaluating the population redistribution effects of selected labor and industrial incentives, [3,11]. However, knowledge of the costs and benefits of alternative incentive systems is limited and usually in a form that does not provide for a systematic evaluation of alternatives.

Concentration

For a specified planning period, what are the benefits and costs associated with concentrating public infrastructure and mobility incentive in selected growth centers as contrasted with present programs that encourage dispersion and in some cases do not permit public resource concentrations? Further, the need is to assess net benefits from direct and indirect income transfers on quality of life plus the attraction effect on private investment.[12].

The issue involves knowledge of scale and agglomeration effects for specified time periods. Other issues relate to the expectation type incentive effect of a complete set of public infrastructural developments, the possible negative impacts on existing urban centers and on labor supply shifts within the region.

A central hypothesis would be that higher levels of growth within a specified planning horizon are achieved by concentrating public developmental resources in designated rural growth centers. A need is to quantify opportunities for increased efficiency in the use of scarce public developmental resources. An approach is to simulate economic and social consequences of complete and partial sets of public investments available under existing and new programs with and without geographic dispersion.

Some of the political issues are minimized when there are an equal number of geographically dispersed growth centers within a state. An issue here is to assess societal costs and benefits of imposing such a political constrain.

This general issues of concentration effects is most important due to the high cost of rural growth center development, increasing concern for public inefficiency and the poor track record of previous programs on rural development.

Common Methodology

The concept of a common methodology centers on comprehensiveness or the construct that permits the integration and synthesis of descriptive and analytical elements. Comprehensiveness also relates to the need for integrating positive, normative and prescriptive type studies; to the catalytic role for structuring truly interdisciplinary type organizational forms; and to further realization of the requirement to interface researchers and political decision-makers.[8]

Any success from the broadening of the concept of rural development planning is equally dependent on qualitative and descriptive studies as on the development and application of dynamic econometric models or general systems simulations.[4]. Commonality in the design of more detailed qualitative studies on concepts of what constitutes viable growth centers, possible impacts of further concentration of public development resources, and the consequences of alternate mobility incentives are absolutely essential to meaningful micro-macro linkages.

As in England, France and Italy, the population distribution issue in the U. S. will likely become a major thrust in sector, regional and national planning. Considerable U. S. legislation provides for planning support at varying levels.[7, 13]. However, the means to coordinate and accumulate the results of such planning are not in existence. The development of common construct by those within a sector, such as in agricultural economics, could serve as an initial force in coordination. Such a common construct would also stimulate interfacing with policy makers at the national level.

Another significant contribution of such comprehensiveness is to assist the operations or systems type researchers, as catalysts in structuring truly interdisciplinary research organizational forms. Such interdisciplinary structures are those utilizing specialized talents in a joint, coordinated and continuously integrated manner. The jointness relates to a common problem set, strong identity with the institute not a discipline, and housed in close physical proximity. Further, the integration results in joint reports and papers where disciplinary identity is obscured. Effective interdisciplinary research is characterized by a holstic approach guided by a theory of the problem set not the body of theory characterizing each discipline.[1].

Still another form of comprehensiveness involves blending of applied researchers and political descision-makers. A preferred common construct is one that the decision-maker concurs on a proxy for his synthesizing model and further one he can interact with or input into in order to evaluate the consequences of alternatives.

Organizational

The inability to institutionally structure research resources on policy and program analyses has limited the usefulness of research or rural development as well as in other problem areas requiring spatial and functional aggregations.[8] Some basic requirements to overcome the discipline dominated multiple disciplinary form of most agricultural research structures relate to:

1. Provision for development of a common theoretical construct to aggregate or integrate research findings in a form most useful to decision makers.
2. Capacities to overcome disincentives associated with attracting quality disciplinarians which are related to inabilities to judge and communicate evidence relating to rewards and recognition.
3. Sufficient financial resources to overcome soft money problems, legislative uncertainty and the loss of contact with disciplinary colleagues and difficulties associated with maintenance of professional status.
4. Development of administrative policies associated with the specification of research work plans, sequencing and scheduling consistent with a time constraint, servant type relationship to the system scientists or problem model integrater, and re-

lated issues that challenge the individuality of the classic research model.

5. Development of an independent goverance structure with its own budget, appointment process, reward system, etc.
6. Development of means to structure the large body of disciplinary specialists typically required to house them together, to overcome their tendency to see the world and solutions to its problems in their own discipline; and to develop an interdisciplinary communications system.
7. Development of an evaluation procedure for such a structure that is without a clearly defined disciplinary peer system, one that has an increased public accountability requirement and one that will likely become involved with the solution and management of societal problems.

To meet these demanding conditions, given institutional rigidities and scarce research resources, will be difficult. If one accepts the assertion that universities are the principal place for such a broad interdisciplinary problem oriented socio-technological program, a minimum type option would be to systematically conduct organizational experiments within the experiment station. Some of the major elements for experimentation would involve an administrative linkage at a regional level, independent structuring of rewards, support for teaching affiliations independent of departmental budgets, development of alternate incentives such as salary differentials or resources for publications independent of existing professional journals, and the development of alternate security instruments as related to disciplinary retraining or study awards.

Another opportunity would be to consider a school of rural (non-metropolitan) studies blending disciplines within the agricultural schools and others. A variant of this option would be a department of interdisciplinary non-metropolitan studies within the college of agriculture–agricultural experiment station complex.

Summary

The increasing concern on issues of population redistribution offers an opportunity and a challenge to researchers focusing on rural development. To achieve a working relationship with political decision processes, some difficult research and research organizational issues must be resolved. Some of the research questions are related to the significance of mobility incentives to modify population distributions, to knowledge of viable growth centers, to the benefits and costs of concentrating resources for public infrastructural developments and evaluating alternatives for a stronger agricultural sector as a component of the growth center.

To bring such research to bear on improvement in rural development policies and programs, a construct for linking micro-macro analyses and a research organizational structure that is truly interdisciplinary in form is required. It has been suggested that experiments with organizational forms be initiated that can overcome departmental dominance, coordinate comprehensive non-metropolitan development planning efforts and relate to political decision makers concerned with national policies of population distribution.

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PLANNING DEVELOPMENT IN RURAL AREAS

by

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Policy specialists and program planners in rural development confront serveral basic questions: In what geographic locations should job inflow or labor outflow be encouraged with public programs? What level and mix of public programs alleviate proverty and underemployment at least public cost? Are economically efficient public programs for rural development consistent with goals and values of the people they are intended to serve? This paper answers these and other questions.

Where to Focus Resources for Development

Year after year opinion polls reveal that people are dissatisfied with the large city and would prefer to live in smaller cities or towns. Even with such preferences, continued residence in the large city may well be rational if economic gains from living there offset personal dissatisfaction with the city *per se*. If economic efficiency declines and living satisfactions increase in comparing smaller with larger communities, then the optimal place of residence entails tradeoffs and compromise such that these two elements (economic efficiency and living satisfactions) just offset each other at the margin.

Data examined below suggest that productivity of workers is higher in larger than small cities when measured in money terms but not when corrected for living costs and

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negative externalities. Four attitudes that relate to well being were found to be for the most part unaffected by place of residence but were instead a function of education, income, and occupation (Tweenten and Lu, 1975). The implication is that place of residence, *per se*, need not be the focal point for centrifugal policies of balanced growth, population redistribution and decentralization. Peoples satisfactions will be improved only if opportunities for income, occupation and education attend a change in place of residence. People will only be made worse off if public policy sends them to micropolitan areas unable to provide adequate economic opportunity.

At least two important economic dimensions exist in the location of economic activity so that the limited resources of this nation can provide the greatest real output. One is provision of public goods and services; the other is provision of private goods and services.

The cost of providing a given quality of a large number of public services have been estimated for cities of various sizes by Morris (1973). After accounting for externalities, the least-cost per capita is in cities of 20,000 to 1 million residents. In general, costs in smaller cities and open country are exceedingly high because of the large per capita cost for schools, roads, health care, utilities and fire protection. Costs in larger cities are high because of the large per capita cost for crime prevention, pollution control and traffic decongestion.

If private enterprise is unable to operate efficiently and make a profit in cities of 20,000 to 1 million residents, some other place of residence is optimal. We examine another dimension of national growth policy, namely efficient provision of private goods and services. The issue of efficient provision of private goods and services conceptually can be viewed as a problem in maximizing the real output of the private economy with given transport costs, manpower, technology and demand. In reality no such optimizing model is operational, and it is necessary to revert to second best empirical procedures. We examine wage and profit rates below.

Lewis and Prescott (1974) reviewed previous studies relating labor earnings to city size and proceeded to estimate new coefficients from regression models that improve on the earlier studies. The coefficients of city size related to wage rates for standard metropolitan statistical areas (SMSA's) were positive and significantly different from zero at the 5 percent probability level or better *only* for fabricated metals, furniture, apparel and "miscellaneous" industries of the 19 industries examined. The authors concluded that "the size of city does not appear to influence the range of average earnings by industry; the allowable mix of high paying firms is not seriously restricted in the SMSA's of the sample." The authors did not correct for age, education, experience, training and other characteristics of the labor force which could be expected to favor high earnings rates for workers in larger cities.

Fuchs (1967) controlled for the effect of race, age, sex and education and concluded that "... standardized hourly earnings in the SMSA's of 1 million and over are typically 20 to 35 percent higher than in SMSA's of less than 1 million."

Unfortunately, past studies of labor productivity have used nominal earnings unadjusted to real earnings by use of living cost indexes. Because living costs increase with city size, such adjustments would undoubtedly erase much of the earnings advantages for large cities in the few industries where earnings advantages have been found. The results are also consistent with the hypothesis that labor responds to earnings differentials, and migrates to erase differences in real earnings over time except for pockets of underemployment.

Previous studies have measured mainly differences in wages rather than labor productivity, which is the efficiency measure sought. If labor supply is short relative to demand, as it was in metropolitan areas during some of the years analyzed, this would bias wage rates upward to show high productivity in large cities. The result casts further doubt on even what little evidence there is that labor is more productive in large cities other things

equal. The observed higher wages in large cities are explained mainly by their relatively high proportion of high wage industries.

A study by Janssen (1974) examines efficient location of private firms by estimating profit rates by industry by place of residence. With few exceptions, profit rates within a given industry were found not to differ significantly by city size. While one interpretation of these findings is that industry can locate anywhere and is equally efficient whatever its location, a more realistic inference is that industry does respond rather quickly to comparative profit incentives and locates where it can make the greatest profit. The latter conclusion also follows if firms locate at random and those which do not make profits fail. In any event, overall industry performance appears to be satisfactory—firms locate in a manner consistent with private economic efficiency.

But the economic efficiency thereof is myopic, equating *private* marginal costs and returns. If private costs (benefits) differ from social costs (benefits), then superb industry performance measured by adherance to principles of profit maximization and equating of costs and returns at the margin does not maximize social real income. Evidence points to the need to change the structure and incentives rather than the performance of the market to raise social efficiency.

Numerous distortions in the market which impede adjustments optimal from the standpoint of society operate to the disadvantage of rural areas. One element is labor costs. Underemployed rural labor has low opportunity cost because little output is foregone as workers are employed in new local industry. Farm output frequently expands as operators are employed elsewhere and units are consolidated. Minimum wage laws, high costs (including paperwork) for social programs such as social security and unemployment insurance, de facto structural wage patterns among industries, labor unions and concepts of a socially acceptable wage all combine to create inflexible wage rates and to make employers pay actual wages above rates that would utilize underemployed rural labor at a profit. If Ford or General Motors must pay a union wage, then they can most profitably locate their plants in large cities where workers are more skilled than elsewhere. But real national output might be greater if they located elsewhere.

Another imperfection in the market is externalities. Firms in large urban centers do not pay the full costs of crime, air pollution and transportation congestion which attends the agglomeration of jobs and people in densely populated areas. If firms in micropolitan areas (or in growth centers of 20,000 to 1 million residents within commuting distance of rural workers) were allowed to pay the low opportunity cost of labor and if firms in metropolitan areas were taxed for the full social costs of these externalities, the results of the wage and profit studies indicate that decentralization would be speeded. Some costs of congestion are charged to the firm because workers demand higher wages to compensate for traffic congestion (although workers are constrained in their demands if jobs are unavailable elsewhere). Other costs of congestion do not accrue to firms because, for example, many workers do not accept the fact or realize too late that their lives will be cut short by air pollution.

As concern over the environment led to controls and other measures to internalize within firms the costs of pollution caused by emissions, incentives were changed and decentralization speeded as jobs and population grew at a more rapid rate in micropolitan than metropolitan areas in the early 1970's.

Programs to Align Private and Social Cost and to Improve the Mobility of Job and Workers

Based on the foregoing analysis, cities of 20,000 to 1 million constitute the most efficient size range within which to encourage growth. Studies by Barrows and Bromley (1975) and by Smith and Tweeten (1975) reveal that the public cost to generate jobs is lowest toward the smaller cities (approximately 25,000 residents) in the size range given above.

A system of taxes and subsidies can align social costs (benefits) with private costs (benefits) and create incentives for firms to locate

where social efficiency is greatest. Because taxes on private firms to adjust for urban externalities often are politically unacceptable, a system of positive incentives to firms which locate in micropolitan areas is appealing. These incentives could take a number of forms. One suggestion is that writeoffs from federal income taxes of locating firms be tied to the degree of underemployment in an area. Or private firms could bid for contracts to generate specified numbers and types of jobs, with the federal government accepting the lowest bids that meet specifications. Another suggestion is to assist the working poor, so prevalent in rural areas, with a wage supplement program to accomplish the intent of minimum wages (provide an acceptable wage to low-skilled workers) but which in fact do the opposite (they cause disadvantaged workers to be unemployed or to be underemployed in secondary labor markets). The wage subsidy has the advantage of directly encouraging employment whereas the capital subsidy would directly encourage investment and only indirectly encourage employment.

The goal of improving the efficiency of markets calls for a federally funded program of worker relocation financial assistance, counseling and training in areas that are unable or unwilling to create jobs for local residents. One major role of economic planning would be to determine the optimal mix of industry location incentives and worker mobility incentives to a given region or multicounty district. Areas unable or unwilling to provide jobs would be eligible for financial assistance to help workers relocate where jobs are available; areas willing and able to attract jobs with location incentives set at the level necessary to overcome market imperfections would be provided inducements for industry location and job creation.

Choosing Areas for Special Federal Assistance to Generate Jobs.

The Rural Development Act of 1972, administered by the U. S. Department of Agriculture (USDA), provides no requirement to focus federal assistance in a critical mass to generate jobs and create an economic takeoff of an area into self sustained growth. The "Statement of Purpose" of the Public Works and Economic Development Act of 1965 stresses the need to assist areas characterized by high unemployment and *underemployment.* In practice, unemployment has been the principal criterion for designation areas for special federal assistance under the Economic Development Administration (EDA).

The Eda and USDA framework and tools for job development are better suited to solve long-term rather than short-term economic problems. Federal job creation efforts focus on making a district or area attractive to new industry or for expansion of local industry rather than moving people to favorable employment opportunities elsewhere or raising the quality of human resources in the district. Within this framework, I briefly review some advantages of selected proposed and actual criteria that might be used to guide job-creating efforts.

Poverty and Median Income. Persons can be poor because they have too few resources or because they are not using "adequate" resources fully. If inherent abilities are undeveloped, a cost-effective means to raise incomes of the salvable poor is through programs of schooling in technical and general skills. Public assistance grants are a cost-effective means to raise incomes of the unemployable poor such as the aged and totally disabled. The poor with adequate resources who are using them inefficiently or not at all may be helped by EDA programs—but underemployment is a better indicator than poverty of the incidence of underutilized human resources. Median income has many of the same disadvantages as poverty in serving as a criterion for focusing EDA benefits.

Outmigration. High levels of outmigration imply that people are making adjustments to supply and demand conditions; it might be unwise to interfere with the process. Programs to provide more efficient labor markets through improved employment date on outlying areas may be required from the federal-state employment service. And local areas may need to be compensated for spillout of local investment in schooling of outmigrants.

Unemployment. While unemployment is a serious problem, high levels of unemployment are frequently a short-term phenomenon more susceptible to amelioration by national monetary and fiscal policies other than the somewhat unwieldy long-term tools used by the EDA to promote development. As noted earlier, unemployment is not closely related to need or underutilized human resources as measured by underemployment.

Underemployment. Bringing jobs to people is likely to be most successful in raising earnings and living levels in places where people are unemployed or are working in jobs that do not utilize their potential—where workers will not be bid away from productive employment. Underemployment is a useful measure of such a situation. Underemployment is measured as the difference between the output of individuals in an area and what they would produce if they were as productive as workers in the nation with similar age, education and training, and is expressed in full-time man year equivalents. Underemployment implicitly includes unemployment.

In many areas, lack of opportunity discouraged people from entering the workforce or caused them to drop out of the workforce for long periods—current unemployment does not record this situation. Low rates of labor force participation are especially prevalent in low income rural areas where jobs in farming and mining have declined secularly. Because the Economic Development Administration focuses efforts on bringing jobs to people rather than people to jobs, and is more concerned with attracting jobs than providing welfare payments or manpower services, the underutilized labor force potentially available for employment in a county would appear to be a felicitous criterion. I recommend that underemployment be the criterion for focusing area activities to generate jobs.

The availability of the underemployment criterion only for census years is one argument against its use. The counter argument is that EDA programs are not geared to deal with short-term changes in the local economy as reflected in current unemployment data. Rather the programs are best suited to attack long-term problems such as underemployment, and the low income and poverty that data show attend underemployment.

If development districts are provided assistance on the basis of under-employment, there remains the issue of how many to designate. By tying write-offs from federal taxes or cash grants to industry to the level of underemployment, a procedure is established which automatically favors areas with high rates of underutilized human resources. But nevertheless, the number of designated districts should be kept small so that excessive competition for industry does not severely raise public costs of generating jobs or substantially reduce development elsewhere. A useful procedure would be to rotate eligible districts say every 10 years (see later systems analysis) so that districts which have reached self-sustained growth and districts that do not respond to incentives can be culled in favor of other districts.

Growth Center

Given that multicounty development districts are selected for federal programs to generate economic activity on the basis of the underemployment criterion, it is well to turn attention to the focus of job development within the district. A large number of multicounty districts contain at least one city of sufficient size and viability to provide at reasonable cost a broad range of community services including a junior college, employment service office, vocational school, hospital with adequate supportive medical personnel, comprehensive shopping center, as well as cultural activities. The growth center (there may be more than one in a district) should be within commuting distance of hinterland residents, which restricts the district size to approximately a radius of 50 miles from one center.

In addition to these attributes of the center that make the district a *functional* economic area, the center should also be a node for sustained growth in employment and make the district a *viable* economic area. Ideally, the center should be of such size or resource potential that it can provide sustained employment growth with a minimum of "artificial" inducements in the form of subsidies to generate jobs.

Growing job opportunities in the center help provide employment for persons needing work throughout the district and compensate

for any economic decline in other parts of the district. The hinterland is less demoralized by declining local population and economic opportunities if it views itself as part of the larger community or district that includes the growth center.

If there is "hot-house" effort to create new jobs through subsidies, this effort might focus on the district growth center, since it will have the best chances to provide an adequate labor force, transportation facilities, markets, cultural activities, schools, utilities, housing and other amenities desired by firms and workers. The growth center concept is also appealing because of insufficient industry and jobs to meet needs of all localities, and hard choices must be made. Concentration on the growth center reduces wasteful competition for "smokestacks" and cuts the prospects for monopsonists locating at each rural crossroad—with only one firm the dominant employer, the temptation exists to exploit workers. This situation is less likely in a larger growth center comprised of numerous competing employers and, consequently, opportunities for workers to switch jobs to improve their position. If one firm cuts employment, alternative job opportunities may be found.

The minimum size of a city to constitute the growth center of a planning and development district remains a point of controversy. Research on optimal place of residence, cost-effectiveness of public programs to generate jobs and other considerations suggest that micropolitan growth centers should be cities of 20,000 or more population within commuting distance of hinterland residents. Common sense sometimes dictates deviations from this general rule. For example, a city of 10,000 which has had rapid growth in the past decade may be a more desirable growth center in a Great Plains district than a decaying city of 750,00 inhabitants in a New England district.

Cities of over 1,000,000 population on the average experience sufficient diseconomies in provision of services and in meeting needs required for the well-being of citizens to be shunned as growth centers. Where adequate size cities are not within commuting distance of micropolitan people, smaller cities within the district can provide the service node for manpower, education, trade and other functions, with arrangements for job information and assistance in changing residence to economically viable metropolitan areas *outside* the district.

Estimating the Level and Mix of Programs To Reach Development Targets

We turn now to a representative study of the efficient level and mix of public programs required to alleviate proverty and underemployment in a multi-county district such as might be designated for special funding under criteria discussed in the previous section.

Efficiency of Selected Programs

Estimates of the cost-effectiveness of public monies in creating new employment opportunities are summarized in Table 1. Each of these programs except public employment have been evaluated and found to have favorable rates of return within the context of national economic efficiency. The programs in Table 1 assume a reasonably adequate level of skill training and general education and no excessive national unemployment—thus education and national monetary policies are not included in the priorities. The table shows estimated direct public expense for creating a permanent job for residents of micropolitan areas. It appears that public employment, which many people recommend as the solution to problems of underemployment in depressed areas, is an expensive way to create new jobs. The net costs, of course, depends on several factors, including the productivity of the workers involved in the program. If the workers are not productively employed, the cost is prohibitive. If workers are efficient in doing work that needs to be done, the real cost can be minimal.

The JOBS program, which utilizes federal subsidies to private firms that train and hire the disadvantaged, requires a direct public outlay of only $6,000 per permanent job created. The JOBS program has limited viability in many rural areas because insufficient numbers of jobs are available. But the program can focus directly on disadvantaged workers, and warrants use where feasible.

Table 1 indicates that moving people to jobs can be more cost-effective than bringing jobs to people. Subsidized loan programs to bring industry and jobs to people are about as cost-effective as tax write-offs when operated at the same level of intensity. Some past loan programs have been much more cost-effective because they operated at low levels of inten-

Table 1. Estimated Public Cost for Creating a New Job for Micropolitan Workers in 1972 by Alternative Programs.

	(Dollars)
Public employment ($6,000 per year for 10 years with 40 percent productivity)[a]	36,000
Industry location through tax write-offs	5,000 to 12,000
JOBS program ($3,000 per job, one-half retention rate; including administrative costs)	6,000
Subsidized migration ($500 direct payment plus $500 for administration and counseling; one-third retention rate)	3,000

Source: Tweeten (1974).

[a]The value of marginal product is assumed to be $2,400 per year and is deducted from the annual public cost. Future costs are not discounted to the present. Secondary job creation is omitted in this and other estimates.

sity. Areas that experience a large net outmigration should be compensated for their investment loss in the form of human capital embodied in outmigrants.

Many less mobile people and those who return home after migrating elsewhere are best served by bringing jobs within commuting distance. Programs such as a tax write-off or grants to a locating industry are needed to bring jobs to people. For the disadvantaged but able bodied workers in rural areas, it may be necessary to combine the two approaches of bringing jobs to people and people to jobs—by paying firms first to locate in viable micropolitan centers, then to hire the disadvantaged.

And finally, for those people who cannot obtain adequate employment because of old age, disabilities, or other valid reasons, improvement in the welfare program—a plan of income maintenance in conjunction with family health insurance—would go a long way toward meeting these requirements. For the most disadvantaged, public-assistance transfer payments are more cost-effective than the programs in Table 1, which are designed for ablebodied persons.

An Application of Systems Simulation to Overall Planning of Public Policy

Nelson and Tweeten (1975) combined computer simulation procedures with a substantial amount of existing empirical data on individual programs to devise a development strategy that is efficient in use of public funds to reach targets of eliminating poverty and underemployment in a low-income, multicounty development district in eastern Oklahoma. The district is not unlike many depressed micropolitan areas and the results may be sufficiently robust to suggest elements for a national growth policy.

The population of the multicounty district was classified into 21 socio-demographic categories based on income, age, ability to work and levels of education and training. The population changed through time due to births, death, aging and migration. It was assumed that a decision making authority responsible for dispersing development funds in an underdeveloped area could allocate these funds among public assistance grants for unemployable poor, education (school dropout prevention), technical training, family planning, industrialization and labor mobility subsidization. These activities could be initiated over and above "typical" public spending in the area. Roads, schools and services and other infrastructure were judged to be adequately funded and improvements could be financed as desired by area residents from the economic base generated by the development process itself.

Multipliers were used to include indirect effects of development activities on both poor and nonpoor in the area. Income resulting from jobs created by industrial development was assumed to continue through the time horizon simulated. Income resulting from jobs made available by labor mobility subsidization was counted as "district" income and was assumed to continue as long as labor mobility program participants did not return to the home area.

Technical coefficients necessary to operate the model were estimated from primary and secondary sources. These coefficients included demographic coefficients, income coefficients, employment coefficients and development activity efficiency coefficients. Only coefficients for labor mobility and industrialization studies are discussed herein to save space.

Labor Mobility Programs

Necessary simulator input information for labor mobility programs includes a basic cost-effectiveness coefficient, a coefficient stating what portion of program funds goes to purposes other than relocation assistance allowances (such as to administration) and coefficients describing the expected dropout or attrition rate for programs. Charles Fairchild (1970) evaluated the cost effectiveness of 67 labor mobility projects funded by the Manpower Administration of the U. S. Department of Labor from 1965 through 1969. Fairchild calculated average public expenditure per relocated worker as $867. Nelson and Tweeten estimated the average public expenditure per relocated worker was $820 after projects to move urban workers were excluded. Adjusted for inflation and micropolitan areas, the cost effectiveness coefficient is $935 per relocatee in 1970 dollars.

For the projects reported by Fairchild, 34 percent of direct public expenditures went to relocation assistance allowances. The remainder (66 percent) went to such activities as administration, pre-relocation training and counseling, and post-relocation follow-up and counseling.

Nelson and Tweeten (1973) estimated from the Fairchild data that approximately 30 percent of remaining relocatees return home each year to be unemployed or underemployed in their home area but that on the average approximately one-third of relocatees remain outside the supply area permanently.

Multiple regression analysis of Economic Development Administration data yielded a cost effectiveness estimate for industrial development in Muskogee, Oklahoma of 5,582 public dollars per direct job created. The estimate for Muskogee, the growth district, showed more favorable cost effectiveness than estimates for any other community in the study area. Adjusting the estimate stated above by the proportion of industrialization projects sampled which were successful (103 out of 176 projects) yielded a final cost effectiveness estimate of 9,538 public dollars per direct job created for use in the simulation model. Multipliers were used to estimate the number of indirect and induced jobs resulting from the jobs indirectly created by industrialization, with appropriate adjustments for the industries in which the direct jobs are created.

Three coefficients describe how simulated jobs generated by industrialization are distributed in the simulation. These coefficients are the percentage of new jobs which go to the area's poor, the new jobs going to workers outside the area as a percentage of new jobs going to people other than the area's poor, and the percentage of old jobs vacated by nonpoor workers which are refilled.

Based on a number of studies (ef. Nelson and Tweeten, 1975), the proportion of new jobs which go to the area's poor was set at 33 percent. New jobs going to workers outside the area as a proportion of new jobs going to the area's nonpoor was entered as 24 percent. Seventy-eight percent of the jobs vacated by nonpoor workers employed in new industry were considered to be refilled.

Results of 13 simulated development strategies were reported by Nelson and Tweeten (1975). One of these strategies assumed continuation of programs in effect in 1970. The other 12 strategies simulated included sufficient annual allocations to welfare or public assistance to remove all unemployable poor from poverty; remaining funds, up to a total annual allocation limit of $75 million, went to various combinations of the other development activities considered. Almost $72 million in welfare grants would be required to remove all unemployable poor from poverty. Almost $50 million were allocated to this purpose (welfare grants) in 1970. Annual outlays of $3-5 million eliminated nearly all underemployment in approcimately 10 years, after which the critical mass of development achieved might well be self sustaining. This outlay for generating jobs was no greater than actual outlays in 1970 but would be used more efficiently.

A major conclusion of the study was that alleviation of poverty and all but structural unemployment is possible with a simple strategy, yielding favorable returns to public development expenditures. After 10 years,

public assistance outlays for the unemployable poor continue to be large. Simulated continuation of 1970 program types and levels, however, indicated that, unless the real dollars allocated to these programs are increased, 18 percent of the total study area population will still be in poverty in 1985.

The heart of the strategy that was cost-effective in reaching targets with public funds was (a) public assistance for the unemployable poor (b) labor mobility assistance in early years while job development was getting started locally and (c) local job development through industrialization. The number of programs in an area development plan need not be large. In fact, real advantages in administrative feasibility and avoidance of waste and program overlap accrue from limiting the number of programs in a development strategy.

Public assistance to provide income to unemployable poor is by far the most massive program in a comprehensive development strategy for the study area. There is no other means to eliminate poverty except by welfare grants to the unemployable poor, who comprised 85 percent of all poor. To avoid increasing transfer payments in the long run, administrative care is necessary to maintain work incentives among the employable poor, to reward those who work more than those on welfare and to discourage family disintegration.

Human resource development programs alone have low payoffs at the margin (over and above existing programs in the district). For efficiency, they must be accompanied by programs to generate jobs locally or increase labor mobility to distant jobs. School dropout prevention and family planning activities were found to be quite shallow, being relatively inexpensive and reaching few people. These programs must be justified on social rather than on economic grounds in the short run but give favorable economic returns in the long run.

Job development, through industrial incentives or other means, is essential to reach development targets. Without this program, it is impossible to ameliorate underemployment with limited public funds. Subsidized migration of employable poor is highly cost effective in the use of development funds, but alone is inadequate to alleviate underemployment in depressed areas because many people will not move at all and many return who do move. By supplying earnings and skills to migrants who will later return home, labor mobility programs serve as "holding pens" to smooth the flow of workers into new local jobs which take time to develop. Thus labor mobility programs can implement rather than compete with industrial development programs except, possible, in the later years of development.

Regardless of what programs are included in area development strategies, if elimination of poverty and underemployment is a major goal, efficient strategies must include public assistance grants and job development. Industrialization cost-effectiveness determined to no small degree how fast underemployment was alleviated by development strategies. For the strategies simulated and the study area considered, underemployment could be alleviated in approximately 15 years rather than 9 years if the cost to establish a permanent new job in industry is $20,000 per worker rather than the baseline $9,538 per worker.

For lack of data, a number of potential programs were not included in the systems simulation model. Payoffs from extension, research, natural resource conservation activities and utility construction (other than to attract industry) have not been estimated. Natural resources investments, such as river basin development, might well be pursued if consistent with national economic efficiency, but the benefits from such investments largely elude local people, especially the low income segment (back, 1969). The record to date on formation of cooperatives to serve low income farmers is mixed, but gives no basis for optimism that such cooperatives are an efficient investment to secure future income streams although they may serve useful social objectives (Marshall and Godwin, 1971).

Consistency of Development Plans with Goals and Values

Rural development plans such as outlined above are unlikely to be successful unless consistent with goals and values of the rural people they are intended to serve. It has been said that fear of unfavorable spinoffs from growth such as pollution, congestion and crime has caused rural people to shun economic and population growth in favor of

the status quo. This conjecture does not characterize rural Oklahoma based on a pilot sample of 110 persons from rural communities in the 10 county Southern Oklahoma Development Association district (Smith and Tweeten, 1975 a). In many cases, the response direction was so overwhelming that conclusions would probably be similar with a larger, less biased sample.

Results of the study were:

(1) A substantial majority (78 percent) of the respondents would like to see their community grow in population.

(2) The vast majority (85 percent) of respondents would consider it desireable for more industry to locate in their respective communities, and 73 percent of the respondents would like to see their community use tax or other concessions to promote industrial development.

(3) Forty percent of the male household heads said they would take a second job, if available, and an even larger percentage said their wife would take a job if available—findings consistent with the high underemployment known to characterize the district.

(4) A large majority, 70 percent, said they would not move to another community within the state to take a better job and 77 percent said they would not move outside the state to take a better job.

(5) Although respondents resisted migration, they appeared to be mobile. Most (75 percent) said they would be willing to drive over 20 miles to work and 40 percent said they would be willing to drive over 35 miles to work.

(6) Nearly 90 percent said they felt the federal government should spend more funds in rural areas. When given the opportunity to choose two programs (from those considered in the above systems simulation) that would do most to enhance the overall good of their community, the most favored program was industrialization (71 percent) followed by education (46 percent) and technical training (54 percent). Public assistance programs and family planning received little support, and federal compensation for moving expenses received the least support of all.

These findings seem broadly consistent with the conclusions reached above concerning efficient programs to promote rural development. Negative attitudes toward migration and positive attitudes toward mobility and job development are consistent with industrial development programs focused on growth centers with minimum reliance on subsidies to speed outmigration. Wage supplements or other work-related welfare reform may maximize income transfers to the poor because they are compatible with the values of rural residents who see little need to expand conventional public assistance programs.

SUMMARY AND CONCLUSIONS

A case is made in this paper for a vastly simpler yet more direct national growth policy than the existing de facto centralization policy and a "Christmas-tree" policy which some have proposed. The fundation of the policy is a comprehensive income maintenance program, which rests on the judgment that the nation should initiate a strong program to foster equity, then stress efficiency in programs of balanced growth using public funds where possible to encourage investment by private industry.

A comprehensive income maintenance program could provide the working poor with incomes at least as high as those on welfare, encourage family stability, maintain work incentives, align payment rates among states and shift costs to the federal government in recognition of the inability of some states to provide assistance at levels that keep social problems from spilling into other states. School funding reform could at once provide outlays for an adequate curriculum, align local taxes with ability to pay, compensate schools for net spillout of benefits, and reduce now powerful incentives for communities to seek industry rather than outmigration as a solution to their economic ills.

Other parts of the proposed policy for rural development focuses on efficiency—improving the market structure and incentives of private industry in making location decisions with maximum free choice left to firms. Incentives to private firms would attempt to align social costs (benefits) with private costs (benefits). Means include a system of tax writeoffs or direct grants to industry and proportional to underemployment in an area, a wage supplement to reduce the private cost of underemployed rural labor to the real costs, and labor mobility assistance to overcome lack of knowledge, capital constraints and other impediments to efficent functioning of labor markets. Planning and implementation would be through multicounty districts, with job creation emphasized in growth centers of 20,000 to 1 million residents within reach of micropolitan commuters.

This policy is as notable for what is ommited as for what is included. It calls for people to be free to locate where they want subject to their paying the social costs as well as receiving benefits of that location. Accordingly, all federal programs that subsidize community services and specifically encourage people to locate in socially inefficient places would be phased out. Federal grants to local governments and organizations for urban renewal, mass transit, model cities, utility construction and general revenue sharing obviously have little justification in this framework. There appears to be no more justification for residents of sparsely populated areas to spend large sums annually for auto emission control to clear the air over our largest cities than for residents of these cities to pay additional taxes to subsidize utilities encouraging people to reside in country estates. To the extent that the federal government can borrow or guarantee loans on better terms than others, concessional loans can be made for water, sewer, electrical and telephone systems and for other infrastructure.

The infrastructure grant and loan programs which now constitute the bulk of the rural and urban development efforts are difficult to justify on equity grounds because few dollars reach low income prople and are difficult to justify on efficiency grounds because community service grants are not a cost-effective means for stimulating economic activity. If communities wish to expend their social overhead capital, they should be free to make their own choice of the level and combination of services they wish to provide, with appropriate exceptions for health standards and for funding of schools and other services with obvious spillover and ability effects. Until a comprehensive income maintenance program is initiated, it may be necessary to provide grants to depressed communities to bring water and waste disposal facilities up to adequate health standards. But on the whole, the appropriate policy is to assist viable communities to generate an economic base; then depend on the community to fund local services as they see fit to satisfy their preferences for the large range of goods and services they must allocate resources among.

No measures of cost effectiveness of public funds to organize and plan community self-help were available for use in systems planning. However, these efforts seem to have most significant impacts on communities when accompanied by other public programs to expand job opportunities at home or elsewhere. Development of lagging micropolitan areas requires local organization, planning and program backup in the form of job generating resources from state and federal sources. However obvious this conclusion that neither organization alone nor planning alone, nor resource backup alone is adequate; it has too often eluded those formulating micropolitan development policies in the past.

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PROVISION OF RELEVANT KNOWLEDGE AND TECHNOLOGY FOR RURAL PEOPLE

BY

ERVEN J. LONG*

Despite the program Designation of Paper I for the comments I shall make on the subject of "Provision of Relevant knowledge and Technology for Rural People." I have not prepared a scholarly paper—but instead just some issues and ideas which I should hope would serve to stimulate some mutual discussion.

There are several reasons for this. First, I happen to occupy that type of Administrative position high enough so I do not have time to prepare scholarly treatises, but *not* high enough to have someone do them for me. *Second*, what I wish to talk about is related to new legislation which may profoundly affect the future of U.S. effort under the subject of our discussion, and which had its first legislative sanction by Congress just this Monday, July 28. But most important of all, the questions I would like to bring up are those on which we would like to have your suggestions—today or later. They are questions for which the answers are not in the back of the book—but which developing countries and we who would help them must answer, somehow, as we work on the development job.

The topic assigned me is not only important, it is ingeniously worded. "Provision of Relevant Knowledge and Technology for Rural People." A little lecture could be built around each word, if time permitted. "*Provision*" —What knowledge to provide? How to obtain or create it in order to be able to provide it? How to determine how much to invest in creation of such knowledge and technology as related to how much to invest in disseminating it to rural people? Who should develop it—public sector or private enterprise? How financed, how institutionalized, to assure a steady flow? How should knowledge and technology be provided? Through organized extension programs? Through stepped up education of farm people so they can seek it out themselves? Through-organized extension programs? Through stepped up education of farm

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people so they can seek it out themselves? Through commercial enterprise, through specific development programs? *"Relevant!"* What does this qualifier mean, in principle? Useable? Profitable? Socially desirable? Knowledge and technology which really accomplishes something significant in economic growth and development terms? Or is the measure more in terms of immediate human values? Are knowledge and technology *relevant* if their results are not felt immediately and directly by specific target groups (such as the rural poor) but only in more indirect and longer term ways through accelerated economic growth of the country?—What if the more indirect approach holds greatly more promise in the longer run? "Knowledge and Technology!" Should these be considered separately, or as different faces of the same factor? How much can be borrowed and how much must be created anew? Who should make the decisions about it? Scientists, government planners, politicians, farmers, private businessmen? *For Rural People? Who are Rural People?* Most farmers in most developing countries live in villages and towns, some small, some large. And many farm families have members who live in cities, contribute money to the family back home, or receive money from it, as their relative needs and fortunes indicate. Who among these villagers and town and city dwellers are "Rural?"

Time does not permit expanding the list of questions nor examination of those I have mentioned. They serve merely to suggest the complexity of this topic—and why we must avoid assuming simple answers or adopting doctrinaire positions.

I would like now to lay out just a few vexing questions which we do face today and on which we as Americans involved in assisting developing countries must make some careful judgments in the years immediately ahead.

The first has to do with how we balance our investments—and recommend to developing countries that they balance *theirs*—between the *production* of new knowledge and technology tailored to LDC needs, and in the means for *disseminating* that knowledge and technology to rural people.

It is of course, axiomatic that we must do both: that knowledge which no one uses speaks to an empty house, and that the spread of useless knowledge serves no purpose. But this axiom, however true, does not face the issue. The question is, how should slender U. S. *and* developing country resources be allocated? Which are the points of relative strength, and of relative weakness, in the existing system?

A few things relevant to this question we *have* learned. We started in the foreign aid business 25 years ago with an assumption that American farmers knew how to farm well, and that our extension agents knew how to advise them on how to farm well. The need was, therefore, to share these extension advisors with the poorer countries to help advise *their* farmers. This didn't work, of course, as there were too many LDC farmers and too few U. S. extension Agents. And, furthermore, our knowledge didn't fit well their needs. So we helped the LDCs develop extension services and community development systems of their own. Some countries quite thoroughly covered their countires with such public servants, but results were disappointing. The reasons for this have not been analyzed sufficiently. Some studies I made and others I have seen suggest strongly, however, that the problem was *not* so much that the farmers wouldn't or didn't make the recommended changes—but that the changes were not sufficiently profitable, or reliable for them to continue; so they drifted back to previous practice. In any event, change-for change-sake serves no purpose, and those changes recommended had no great power to alter the basic situation of pitifully low productivity and hence low incomes to the farmers.

More recently, we have seen instances of radically changing faces of agriculture in certain areas of the underdeveloped world—with farm production and incomes going up rapidly. These are usually local phenomena, whose magnitudes are masked in national averages. In each important case of which I am aware, these farm development Oases have been the result of a quite radically changed technology, so profitable and low risk to farmers that the news spreads almost by word of mouth, from farmer to farmer.

One of the phenomena we need *much* better to understand is how the processes of farmer-to-farmer communication can be most effectively harnessed for extension purposes. In separate studies I did in Wisconsin, Tennessee, and India, I found that the vast majority

of farmers who adopted improved practices *said* they got the information from other farmers. What makes this happen? How can it be harnassed to minimize public sector cost? Certainly, the profitability of the new practice is a factor, but there must be others.

We have learned, of course, that our knowledge and technology does not apply *directly* to the LDC; it has been developed to deal with an agriculture vast different in all respects—climate, soils, size of farm, literancy levels, etc.— from most of the developing countries.

But we have also learned that this cannot be done individually by and within each country. The cost of developing new knowledge and technology with genuine power to transform the basic parameters, is a high cost investment. We must develop systems which find those basic things of sufficient generality that they need be done at only one or a few places at most, and do them there on behalf of the entire world. And we must identify those things which *must* be done locally, and do them *in situs*—and work out all the combinations in between.

To attempt to develop all the needed new science and technology in every country individually will simply be too costly. It will foredoom the LDCs to trivial improvements, economic backwardness and the world to ever shrinking per capita food supplies. Even *we* cannot afford longer to develop our own knowledge and technology for our own agriculture in isolation from potential contributions of researchers working throughout the more and the less developed world.

But even with the best systems for developing new knowledge, there arises the prior question of financial requirements, hence, my question of relative priorities. I raise it because it is currently on the budget Agenda of every LDC and of most Assistance Agencies in one way or another. I am told that the LDC public allocation to research functions is about one sixth their allocation to extension, whereas our allocation to research exceeds that to extension. Which is the proper way for LDCs to go on this?

My *second* broad concern has to do with how we and the LDCs can *shape* knowledge and technology to fit the needs of LDC farmers—especially those who constitute the rural poor.

Our Congress, and the Executive Branch of Government expressing the attidues of the American public, and certainly my own point of view, have strongly mandated that U. S. foreign aid should be directed at helping the "poor" essentially the "rural poor." This is based on the obvious fact that there is no U. S. interest, nor should there be, in having rank and file taxpayers contribute— even though ever-so-little-to the well being of foregin persons already as well or better off than they.

It is built also, I fear, on a presumption that our past assistance has *not* been so directed. However true this may or may not be for other forms of assistance, I do not know; but I do believe that most Americans working overseas on behalf of LDC agriculture would be surprised to learn that they have not been working on behalf of the poor, would in fact vigorously deny it.

But there is *some* truth in the fact that we have not asked, analytically enough, just how we can shape technology specifically for this purpose of serving the poor.

Unfortunately, there is a lot of confusion and a muddle of reason and rhetoric on this point. Because American agriculture is "efficient," and because American farms are getting even larger, there is a persisting belief that large farms are getting even larger, there is a persisting belief that large farms are getting even larger, there is a persisting belieft that large farms are necessary to efficiency in food production. Hence, we must always choose, so this misconception holds, between increased efficiency which benefits the larger, richer farms, on the one hand, and inefficient, subsistence type farming on the small farms, on the other hand; in other words between agricultural progress and social equity.

Fortunately, this is not the case. This is one area in which I have researched all my professional life. The evidence is now overwhelming and all serious scholars agree, that from an economic point of view overall efficiency tends to be optimized on a size of farm roughly equated with an equal division of resources among the families who must earn their livelihood from farming. Returns per input unit are *not* higher, but generally lower, on the larger than on the smaller farms, *everything else being equal*.

Technology in the abstract favors neither the larger nor the smaller farms. *Most* of the

more dramatic technological developments in LDCs in recent years have, in fact, been adopted in countries and regions with small rather than large farms. And yield increases have been associated primarily with small farm agriculture.

However, knowledge and technology do not develop in the abstract; they are created by groups of people working on sets of problems. In this country, these have been largely the problems of the larger, commercials farms–and the knowledge and technology have solved *their* problems and fitted *their* needs. In the long run, this may have been wise policy for us. I do not know. It has certainly provided the sinews of general economic growth. But such technological development will certainly ill fit the needs of the LDCs, and our mandate to be concerned with the poor.

This heart issue, in my belief, has two dimensions: (a) how to get the agricultural economists and perhaps other rural social scientists to work on the hard, gutsy problems of technology development; and (b) how to get the "rural poor" to be able to identify their needs in forms that researchers and technology developers can work on effectively, and to demand that knowledge and technology be developed to meet their *specific* needs.

I do not know which of these two dimensions of the problem is the tougher. Although the problem of getting economists and other social scientists to work with the production oriented scientists to shape technology to meet special requirements would seem simple and straight forward, efforts to do so have been difficult to achieve. Basically, I feel that the problem lies with the over compartementalization of the disciplines, the over departmentalization of our universities and, most especially with my economist colleagues' overweening desire to work with other economists on grand national or global models–useful in their place–rather than with their natural science colleagues on the nittygritty problems of design of a production research project against a mix of productivity and equity goals.

I struggled long and hard on one occasion, with much help from top administrators at the Contracting University and in our own Agency, to bring a very successful research project on weed control to meet the needs of the multitudes of common, small peasant farmers fo Latin America instead of the few large commercial farmers comparable to our own. Agricultural economists were quite excited at first, but quickly began to transform it into a project to design a large sector simulation model to deal with all aspects of agricultural policy, including, to be sure, approaches to technology and, oh yes, a little about control of weeds. But general simulation models don't kill weeds. Chemicals do, tools do, crop rotations do, hand weeding does. The project was eventually brought down to earth and is, in fact, under the direction of an economist trying to get the production research directed to the right set of economic and social parameters relevant to the small farmers. Our other efforts of a similar type have not always had such a promising outcome. I leave it with you, my colleagues, to find the answer. If we do not find it, small farmers and other rural poor may well find that the knowledge and technology available to them fits their needs in a few spots and misses in many, and the opportunity to have participated effectively in development will have passed them by.

My (b) question, as you will recall, is how can the poor farmer or other rural person become able to *identify* his problem in a way that can be effectively worked on–and bring his country's knowledge and technology developing institutions to account in serving his needs? This is, I feel a real intellectural challenge to us all, especially the derived question: how can we help him, the rural person, develop this capability?

There has been a great deal of attention of late–in research and in policy–on one part of this problem; namely, the development of institutions through which such people can communicate effectively their felt needs and desires. *"Participation"* is the key work in this dialogue.

This emphasis in sound and I applaud it. But I feel that the first part is the tougher: how they can come to *identify* problems and needs in forms that lend themselves to solution!

One anecdote will illustrate. As a part of a graduate course on research methodology I taught to junior university professors in India (from all major departments of their University) I organized interview teams to try to

identify key research problems felt by representative Indian villagers (i.e. farmers) in our locality. The interviewers were professional agriculturists with some presumed special competence in problem identification. What they came back with were problems such as: Our incomes are too low: we don't have enough land; prices are too low; our labor costs too much; the government isn't doing enough for us; taxes are too high.

What they didn't see as problems were that *average* yields of their principal grain was 600 lbs. per acre, but *some* fields yielded 3–4 times that amount. Why? They didn't see irrigation water actually flooding out the little bit of rice grown below the small ponds and their adjacent upland crops shrivelling for want of water. Why? They didn't see their dairy cows yielding only a few hundred pounds of milk a year for want of feed, and so overgrazing the grass that its production per year was a small fraction of that in the few enclosures the cattle couldn't reach, and what could be done about that?

Commercial farmers would have communicated different kinds of problems: researchable problems to which knowledge and technology might well be relevant. The old adage that "the squeaky wheel gets the grease" is probably universally true-even in cultures in which the wheel is still foreign. But the squeak must carry a message with meaning. This is an issue with a multitude of remifications-calling for thought and analysis.

In closing, I should like to comment briefly on what may become a mementous legislative breakthrough, rich with implications for us all.

Last Monday, the House Committee on International Relations passed an amendment to the Foreign Assistance Act which was introduced by Congressman Fred Findley of Illinois. It represents months of work on his part, in discussion with Universities, and by AID. It will probably and properly be known as the Findley/Humphrey amendment, as it is sponsored also by Senator Humphrey. It also may be known as Title XII, as this will be its numerical designation in the Act if it becomes law.

It merges AID's interest in getting a new legislative mandate in research with Congressman Findley's wish to get U. S. Universities more fully involved in Agricultural Institution building in the LDCs. Though the amendment is lengthy and would accomplish several purposes, its central goal and purpose it to develop and institutionalize a more participative role by our universities in the agricultural programs of AID, and to place such programs on a larger term, more secure basis. Many tough problems lie ahead, in getting the amendment passed by Congress and adequate funds for it, and even more importantly, in getting this new relationship between AID and the universities effectively and realistically structured. The amendment will be, in my belief, what we succeed in making it become. To be effective, it will require a quality of intellectual, analytic and institutional discipline by all of us of a degree not yet developed. The questions I have noted and issues I have touched on are just a few of the substantive matters which must engage the attention of all of us working, in part through this new amendment, I hope, on the problems of "providing relevant knowledge and technology for rural people."

THE IMPORTANCE OF COOPERATIVE EFFORTS IN PROVIDING COMMUNITY SERVICES

BY

WILLIAM E. HARDY, JR.*

There is much discussion today concerning the availability and adequacy of public services and facilities in rural and nonmetropolitan areas. Necessary services such as sewer and water systems, transportation systems, solid waste disposal systems, education and medical care are simply nonexistent or are of very low quality in many rural areas. Efforts to improve public service delivery in many of these areas have resulted in only limited im-

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provements in service availability and little, if any, reduction in costs.

In this paper, we are going to first look at the basic qualities of a public good and see why a governmental unit rather than private enterprise must provide these services. We will follow this with a discussion of the basic type of governmental unit and organization which is used to supply or administer public services and some of the associated problems and close with a discussion of two research projects in which I have been involved. The results of these projects point clearly to the economic gains and improved public accessibility that can be realized through the initiation of co-operative efforts in providing certain services.

A Public Good

There are two basic qualities of certain goods which more or less prevent the market system from supplying the proper amount of these goods. In economic literature, we normally refer to these qualities as nonrivalness and nonexcludability. By nonrivalness we mean that when one individual consumes a good he does not diminish the satisfaction or consumption benefit that another individual gets from the good. For example, our nation's defense network protects me from foreign aggression. The fact that I am protected does not keep you from being protected. Contrast this to a loaf of bread in the market place. If I consume a loaf of bread then you cannot have any of it.

The nonexcludability concept implies that an individual connot be prevented from consuming a good for nonpayment. Again using the military for an example, if I do not pay taxes to support our defense system, my degree of protection is not diminished. Even if I go to jail for nonpayment of taxes, I am still protected. In contrast to the market good, if I do not pay for the loaf of bread, I cannot consume it.

These two qualities, nonrivalness and nonexcludability, work together to create what is called the "free-rider effect." Since my consumption of the good does not reduce the enjoyment that you get from the good you do not care whether I consume it or not. Also, since I cannot be prevented from consuming the good for nonpayment, I will not pay. I will wait for you to pay for it and I will take a "free ride." It is perfectly rational for each individual to have this viewpoint and as a result, without some form of government or collective action, the good will not be supplied since no individuals are willing to buy.

Now let us see how some of our more common public services fit into the conventional public good framework, Sewer and water systems exhibit the quality of nonrivalness, however individuals can be prevented from using such service if they do not pay the established fees. Transportation systems present a similiar situation except that there is some degree of rivalry. Each vehicle can carry a finite number of passengers. Solid waste disposal systems are also similar to these cases if door-to-door pickup and a fee system is used, but such systems are more like the conventional public good if containerized collection is used. With this type of collection, individuals cannot be charged for the amount of waste that they place in the public container. The educational process is a good in which we see some rivalry but in our public system, little excludability. Medical care, as a service, also has a fee structure which serves to restrict entry and crowded waiting rooms clearly demonstrate that there is rivalry. This rivalry for the use of our limited medical resources, coupled with uneven distribution of these resources relative to population have created severe shortages of medical care in many rural areas. Public health programs have removed the excludability problem, but the rivalry and limited accessibility still exist.

Another important factor which forces governmental or collective efforts in the supplying of some goods is the scale of the operation that must be established to make provision of the good economically feasible. In densely populated areas, the demand for certain services and facilities might be concentrated enough to areas, however, the total demand will like ly not be great enough to entice private enterprise to enter the market for the particular good and will also place severe hardships on small governmental units in their attempts to provide the service.

A final factor which we must consider when we look at the use of public services is the costs that are levied upon society when an individual, because of an established fee structure or because of limited access, decides not to use the service. In solid waste disposal for example, a household may elect not to pay the pick-up fee or deliver the waste material to a suitable container and dispose of it on his

own or adjoining property. This creates pollution forwhich we all must pay. If an individual does not seek medical service because of the fee structure or because it is not convenient then we will all pay through that person's lost productivity and additional medical costs and resources that may be used if the person should become more seriously ill.

Governmental Organization and Service Delivery

Because of the nonrivalness and nonexcludability qualities and the sparse populations of most rural areas, we are forced to rely upon some form of governmental unit to provide the necessary services. These collective units solve many service delivery problems, but at the same time, create many more. Lonnie Jones and Paul Gessaman, in a paper presented to the 1974 Annual Meeting of the American Agricultrual Economics Association, point out many of the problems associated with such agencies.[8]

In discussing the public bureau, the most common organizational form for public service delivery, they attempt to answer two questions. "What are the efficiency implications of alternative organizational forms for service delivery? And what are the implications of alternative organizational forms for consumer satisfaction with service delivery?' They indicate, through reference to the research of others, [10] that the public bureau can be thought of as a "non-profit monopolist operating under a cost reward system different from that familiar to privately owned profit-making firms,' leading to an inefficient use of resources. Even more inefficient than the monopolist operating in amarket setting. The basic problems come forth through the management of the public bureau. Jones and Gessaman stress that the bureaucrat attempts to maximize *his* satisfaction through viewing such variables as salary, reputation, size of the budget and ease of managing the office. Such objectives may lead to further inefficient use of resources and make the public service organization a great deal less responsive to the needs and desires of the public which it is designed to serve, thus reducing consumer satisfaction. The design of the public bureau breeds such desires of the public which it is designed to serve, thus reducing consumer satisfaction. The design of the public bureau breeds such desires in their management. We cannot hope to enjoy the efficiencies which should come from consolidated, properly organized governmental systems without some alternative organizational form which would encourage management to be cost and customer conscious. Such a system would require clear and direct channels for information to flow from the user to management.

The Cooperative Effort

Numerous studies have been completed recently which were designed to examine the economics of consolidating and combining governmental units in their efforts to provide needed community services. As might be exptected, some studies have indicated that savings could be realized through consolidation[7] and others have indicated that smaller service units were more economically efficient[1,11]. The basic conclusion of these studies was that economies of size were realized up to a point and after that, costs either remained relatively constant or increased as inefficiencies in management began to create diseconomies.

Two studies in which I have taken part indicated similar results–gains could be realized over a given level of consolidation and increased costs thereafter. I feel that the results of these studies are valid and I would like to discuss them further with you.

A Regional Solid Waste Program

The first research results which I would like to discuss came from a recently completed project in which we were attempting to determine the least cost solid waste management system for a five county area of northwest Alabama[3]. The research results permitted a determination of the best number and locations for sanitary landfills for each of the five counties, three multi-county subregions and the entire five-county region taken as a whole. The size of the service area for each landfill and the best routes for the trucks to travel in collecting the solid waste were also determined.

Several computational steps were required to establish the least cost system for the five-county region. First, potential sites for sanitary landfills have to be established. A total of 34 potential landfill sites were designated throughout the area with site selection being based upon soils data supplied by the Soil Conservation Service. Pick-up points for locating waste disposal containers were estab-

lished through the use of census enumeration district maps. These maps, with their associated population data, made it possible to designate 237 pick-up points distributed throughout the area relatively near the population. The map presented in Figure 1 illustrates the spatial distribution of the pick-up points and the potential landfill sites. Each city within the area was assumed to have its own collection service which would deliver the waste to a central transfer station. These points were considered as a single pick-up for each city for transfer to the landfill.

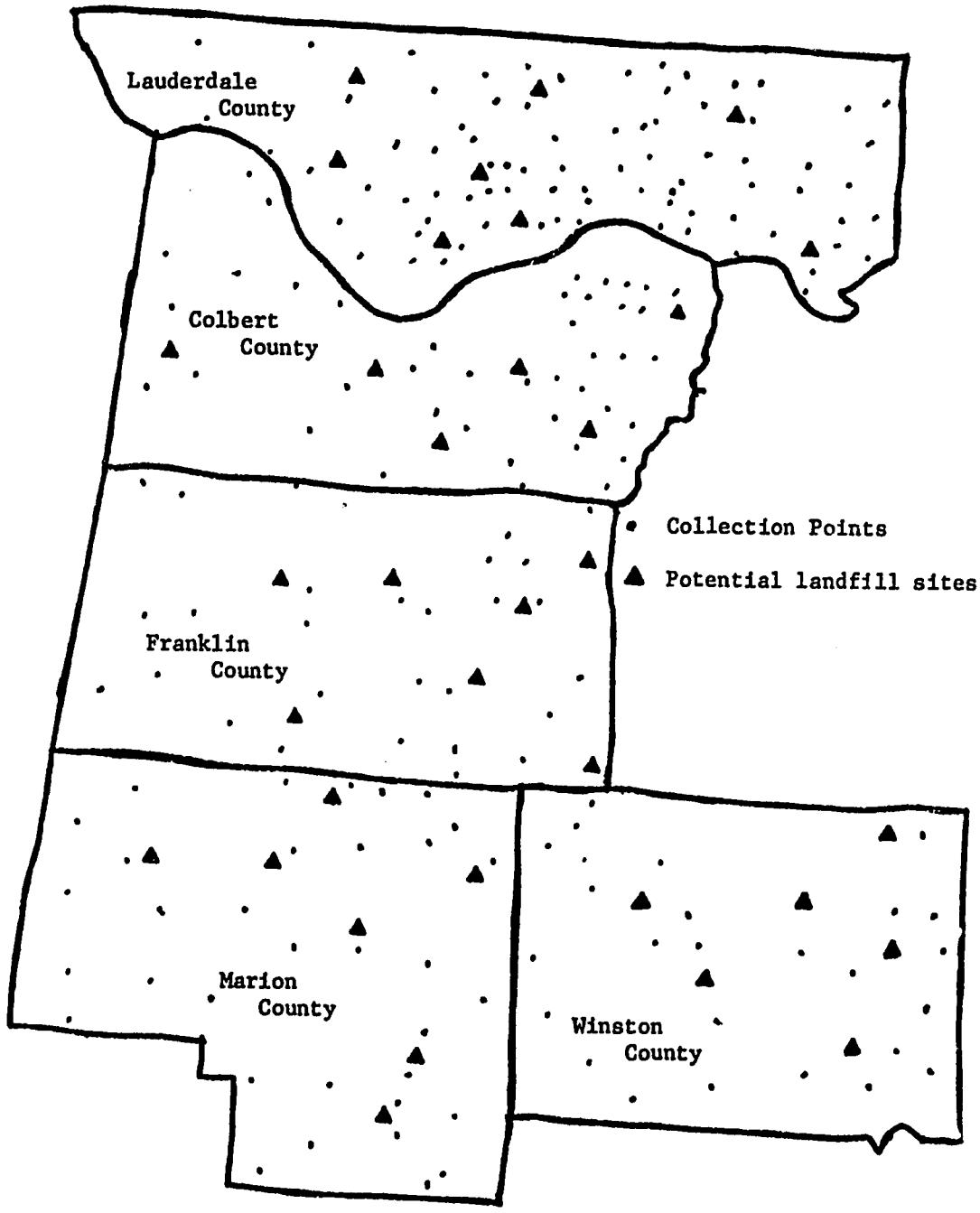

Figure 1. Spatial distribution of solid waste collection points and potential sanitary landfill sites.

TABLE 1

Initial capital investment, and annual operating cost for specified number of landfills in five counties of northwest Alabama

Area served	Number of landfills	Initial investment	Annual operating cost
	(number)	(dollars)	(dollars)
Winston County	1	203,450	83,461
Winston County	2	317,715	118,342
Winston County	3	409,967	171,948
Marion County	1	222,730	100,630
Marion County	2	337,275	139,596
Marion County	3	428,627	180,298
Franklin County	1	218,405	95,317
Franklin County	2	332,885	134,457
Franklin County	3	424,387	179,737
Colbert County	1	283,480	114,375
Colbert County	2	388,225	149,350
Colbert County	3	514,557	211,981
Lauderdale County	1	429,630	167,072
Lauderdale County	2	492,645	171,836
Lauderdale County	3	630,147	248,895
Col., Lau.[a]	1	613,535	239,971
Col., Lau.	2	679,820	255,098
Col., Lau.	3	799,966	278,402
Win., Mar., Fkl.[b]	1	486,275	215,370
Win., Mar., Fkl.	2	540,775	240,445
Win., Mar., Fkl.	3	660,674	275,712
Win., Mar., Fkl., Col.[c]	1	696,950	301,219
Win., Mar., Fkl., Col.	2	732,100	300,859
Win., Mar., Fkl., Col.	3	849,699	309,474
Region[d]	1	1,130,195	505,480
Region	2	1,039,495	442,755
Region	3	1,139,495	456,197
Region	4	1,266,095	502,621
Region	5	1,397,695	538,313
Region	6	1,470,890	594,192

[a]Colbert County and Lauderdale County

[b]Winston County, Marion County, and Franklin County

[c]Winston County, Marion County, Franklin County, and Colbert County

[d]All Five counties

The next step in the computational process was to determine the best location for various numbers of sanitary landfills for each county, subregion and the total five county area. A computerized "best location" algorithm[5] selected as best those potential landfill locations which would minimize the total travel if a single trip were required to deliver the waste from each collection point to the sanitary landfill.

After each best location was determined, a computerized routing program[4] was used to determine the least cost routes for the garbage trucks to travel in collecting the waste products. This route analysis permitted a determination of the amount of time that would be taken in serving each landfill and the number of trucks required.

The final step in determining the least cost solid waste management system for the five county region was to assemble the results of the location and routing analyses into cost data. The data presented in Table 1 illustrate the initial investment and operating costs for specified numbers of landfills for each county, for three multi-county subregions and for the total five county region.

The data indicate that there are definite economies of scale to be realized in the operation of a solid waste management system in the five counties being considered. These economies are realized through the interaction of the landfill operations cost and the assembly cost involved with collecting and transporting the solid waste material. As the number of landfills is increased, the size of each operation and its respective service area is decreased. This decrease in the size of the landfill operation possibly makes for more inefficient use of landfill equipment, thus creating diseconomies. The decrease in the size of the service area, however, reduces the number of transport miles that each truck must travel, giving a possibility for cost savings.

For each individual county and for the two subregions covering the smallest geographic area (Colbert and Lauderdale, and Winston, Marion and Franklin), the least cost system from the viewpoint of annual operating cost is to have a single sanitary landfill. However, as the area being served was increased to four and five counties, the data indicate that costs can be reduced if two landfills are used, but increased if three or more are established. The total cost curve presented in Figure 2 illustrates the annual regional operating cost data given in Table 1 and emphasizes the presence of economies of scale of the regional solid waste management system.

The major objective of the research was to determine the least cost collection and disposal system for the total five county area. The data presented in Table 2 represent the total annual operating costs for various systems which serve the entire five county region. These cost values indicate that definite dollar savings can be realized if the five counties considered in the study cooperate in the operation of a solid waste management system. The least cost system from the regional standpoint is to have two regional sanitary landfills. This alternative, with an estimated annual operating cost of $442,755 would permit the counties to save more than $12,000 annually over the second best alternative and more than $118,000 over the alternative where each provides its own system. In fact, there are at least ten possible systems which have a lower annual operating cost than the combined individual county system, costing $560,855.

The results of this study clearly indicate that there are economies of scale to be realized in the operation of a solid waste management system and that a regional system can be justified from a cost standpoint for the study area.

A Regional Health Care Program

The second project with which I have been associated in the area of planning a regional approach to service delivery was a Department of HEW sponsored project directed toward health care[6]. The availability of adequate medical services is a problem facing many rural communities. One possible approach to solving the problem is through the use of satellite clinics staffed with paramedical personnel or a nurse practitioner working with a doctor or team of doctors stationed at a central medical facility[9]. With this concept in mind, a study was designed to determine the best locations for specified numbers of such clinics in an area of central Virginia. The area included four basically rural counties (Nelson, Greene, Fluvanna, and Louisa) having very limited medical resources and one more urbanized county (Albemarle) with the city of Charlottesville and bountiful medical

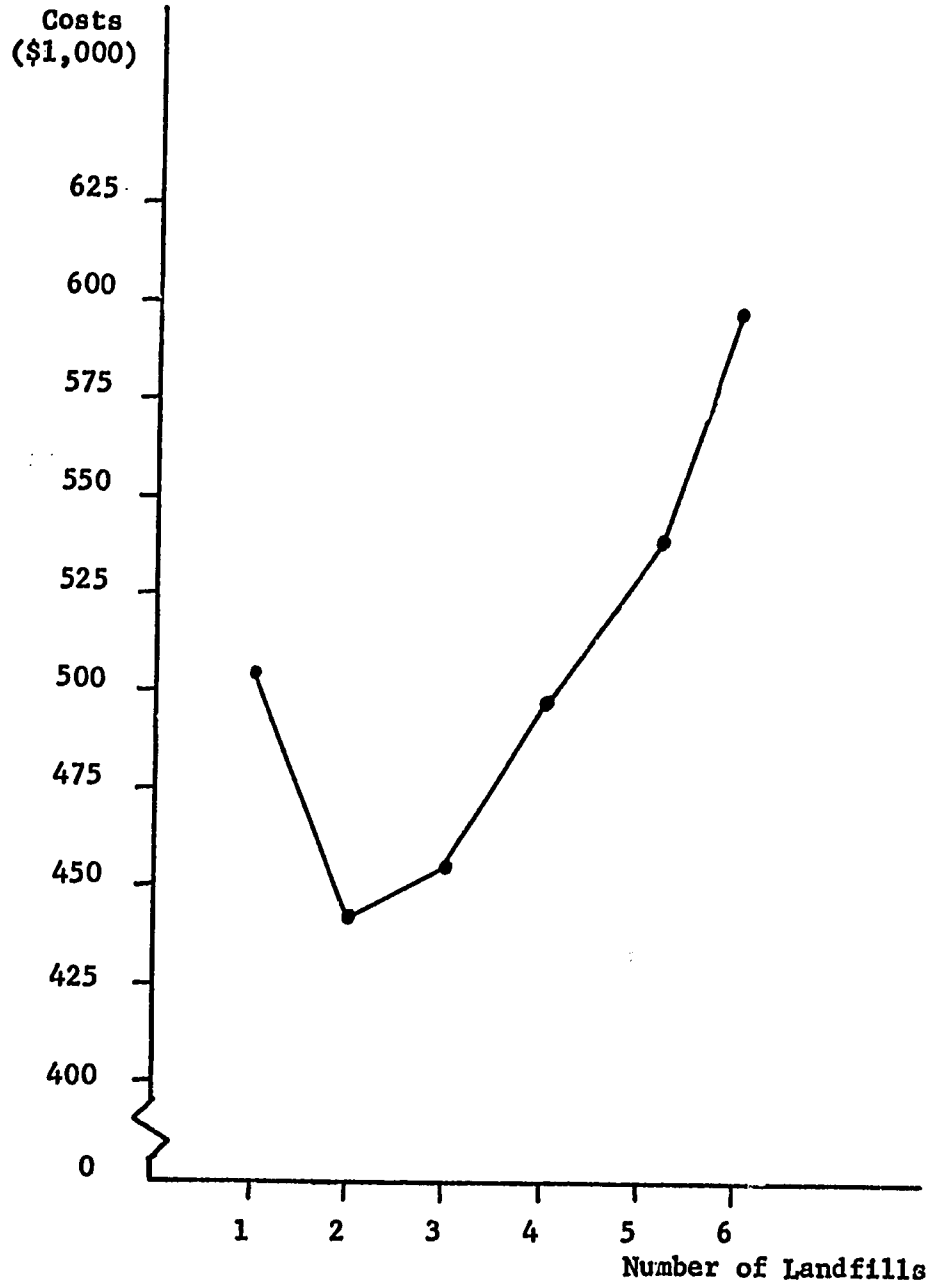

Figure 2. Annual operating costs for specified numbers of landfill operations in the five county region.

TABLE 2

Total annual operating costs for various solid waste management systems serving the entire five county region

System combination		Annual operating cost	Total annual operating cost
Counties	Number of landfills		
		(dollars)	(dollars)
Region[a]	2	442,755	442,755
Win., Mar., Fkl.[b]	1	215,370	
Col., Lau.[c]	1	239,971	455,341
Region	3	456,197	456,197
Win., Mar., Fkl., Col.[d]	2	300,859	
Launderdale	1	167,072	467,931
Win., Mar., Fkl., Col.	1	301,219	
Lauderdale	1	167,072	468,291
Win., Mar., Fkl.	1	215,370	
Col., Lau.	2	255,098	470,468
Win., Mar., Fkl., Col.	3	309,474	
Lauderdale	1	167,072	476,546
Region	4	502,621	502,621
Region	1	505,480	505,480
Region	5	538,313	538,313
Winston	1	83,461	
Marion	1	100,630	
Franklin	1	95,317	
Colbert	1	114,375	
Lauderdale	1	167,072	560,855

[a]All five counties
[b]Winston County, Marion County and Franklin County
[c]Colbert County and Lauderdale County
[d]Winston County, Marion County, Franklin County and Colbert County

resources at the University of Virginia Medical Center, Figure 3.

For the analysis, it was assumed that individuals needing medical care would travel from their homes to the satellite clinic for initial treatment and screening and that some of these would be referred to the central medical center at Charlottesville for more intensive or extensive treatment. It was also assumed that the use of existing medical resources in rural areas would be continued. As with the solid waste project discussed earlier, census enumeration district maps and their associated population data were used to specify the geographic locations of the area residents and their associated demand for health care. A total of 88 demand points were designated throughout the five county area to represent this demand. The assumption was made that these points would also serve as potential locations for the satellite clinics.

Two sets of location analyses were completed. One permitted the satellite clinics to be located only within Albemarle County, while the other permitted clinic location within any of the counties—total regional cooperation. The relative locations for up to five clinics are illustrated in Figure 3.

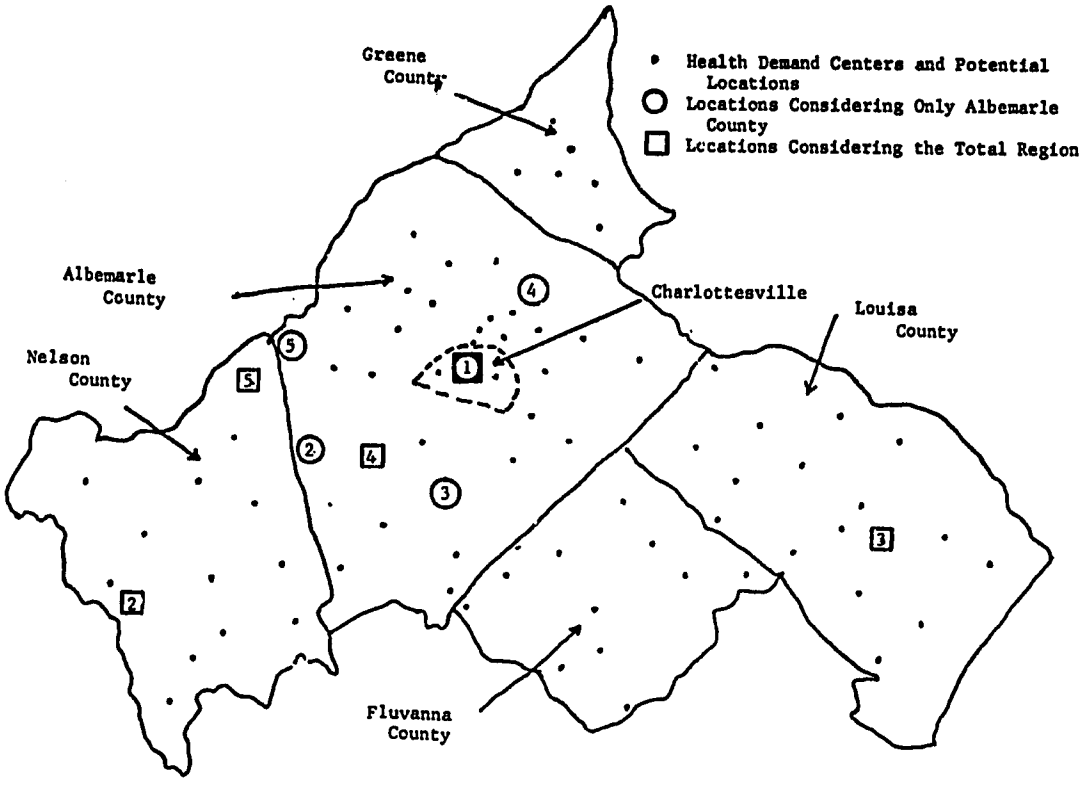

Figure 3. Specified points of health demand and potential clinic sites for five central Virginia counties and sites selected as best

TABLE 3

Best five locations, expected annual clinic visits and average miles per visit for rural health clinics serving five central Virginia counties

Only Albermarle County locations considered			All possible locations considered		
Clinic number	Annual clinic visits	Average travel miles per visit	Clinic number	Annual clinic visits	Average travel miles per visit
1	221,897	5.41	1	226,725	4.22
2	22,334	23.55	2	19,850	25.05
3	20,140	16.78	3	15,291	24.10
4	19,154	11.70	4	28,022	14.64
5	17,753	20.60	5	11,390	13.54
TOTALS	301,278	8.81		301,278	7.92

The data presented in Table 3 illustrate the savings that could be realized through regional cooperation in terms of average potential miles traveled from the patients' homes to the clinic site. If Albemarle County alone attempted to serve the region's needs, each patient visit would require an average of 8.81 miles of travel. From a regional viewpoint, however, the total demand could be served at an average of 7.92 travel miles per visit, saving nearly 270,000 annual patient miles. At 15 cents per mile, an annual saving of $40,000 in travel costs could be realized, a significant amount when we consider that many of those who would visit these clinics would be from lower income groups.

Is Regional Cooperation the Answer?

The two studies which we have discussed indicate that the regional concept for the provision of community services could reduce costs and increase accessibility. Such programs could be highly successful if administered and promoted properly. In these days of increasing accountability for public funds and increased demand for public services, we must attempt to use the most economically efficient means at our disposal.

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PLANNING AND IMPLEMENTING SOCIAL SERVICES: AN INTEGRAL PART OF RURAL DEVELOPMENT

BY

JOHN L. FISCHER*

I. Introduction

The purpose of this talk is to stimulate dialogue and discussion which I have recently come to believe is absolutely necessary if dangerous trends are to be reversed, and more than a lucky few of the developing countries avoid rapidly increasing levels of social disorganization, economic chaos, political instability, and finally violence. Their already crippled

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**Resulting from rapidly rising oil prices and world wide inflation.

developmental efforts** will be further damaged, and a viscious circle be initiated. I make no claims for presenting "objective truth," but rather draw on observations and experience as: (1) a national level agricultural and rural sector planning, economic research and policy adviser, (2) project evaluation and management consultant, (3) aid agency administrator, and (4) academician interested in socio/economic development.

I do not apologize for avoiding any pretext at expounding "objective truth" because if there is anything we should have learned from experience during the past 20 years, it is that in development, "objective truth" is extremely elusive. Many development programs now regarded as failures were based on what at the time was accepted "lock, stock and barrel" for "objective truth." Academia including the research sub-community, is as guilty as anyone for speaking with force and authority when questioning, contemplation and humility would have been more appropriate. For example, the highly touted green revolution, once regarded in many circles as the ultimate solution to hunger, is now recognized as having many shortcomings, some socio/economic, but some technical. [1] An article in a Kenya Newspaper in mid-June said it had turned "Brown," and another author had dubbed it the "Red Revolution." [2] Community Development (CD) was being pushed hard by aid agencies 20 years ago because it was thought to be based on "objective truth." CD is now almost a "dirty" word! At the moment countries stressing small scale agriculture, which some of my colleagues once regarded as totally uneconomic and with no role in a development strategy, seem to be doing the best in both meeting their national food needs, and spreading the base of benefits from growth.[3]

The benefits from the discussion I hope to foster could be:

(1) In the short run: Improvement in the quality of judgment utilized by administrators in planning agencies and policymakers, and,

(2) In the long run: Revision in questions being asked in the research effort devoted to socio/economic development topics.

II. The Need For Social Services In Rural Areas

The developing countries differ in many ways, but one problem they share–social services in the rural areas fall far short of those available in the urban areas. In many developing countries the real level of living for typical rural people ranges from 1/15 to 1/30th that of urbanities. The differential is a major cause of the catastrophic, worldwide rush to already troubled cities. In several countries rural to urban migration is being halted by police action.

Rural development generally "gets moving" only when the cities "explode." In the United States the rapid rise in interest in rural development (RD) in the political arena in the late 1960's was, in substantial degree, a result of the belief it could choke off the rush of rural folk to the troubled cities. In 1970 leaders of both the executive and legislative branches tide that . . . swells the nation's metropolitan areas."[5] My wrath for developing country leaders who become duly concerned for the rural masses only when the cities are about to explode is moderated only by the fact that my own country has done no better.

III. The Problem

The need is clear, and what is to be accomplished or how to create a delivery system are no serious problems. Aid agency files are filled with reports of projects where rural social service needs were recognized, and an external agency rose to the occasion and helped create a system for meeting the need. Typically, the local people recognize the value of the benefits, and are appropriately appreciative. No insurmountable problems arise until the external resources have to be withdrawn, i.e., the aid agency "pull out." At a recent Conference on Development in Africa, sponsored by the University of Arizona College of Nursing, illustrations cited of programs collapsing, or being abandoned, included an effective health service, hospital, malaria program, and others.[6] The frequently un-

answered question is how to do the job and make the solution "take," given the socio/economic environment and constraints at local, national and international levels.

Where programs or projects have failed, was failure predictable because the crucial aspect of the problem was not properly perceived from the beginning? I suggest the answer is "Yes," and we can obtain proper perception by asking, "Why do rural people not already get more and better social services?" The "simple answer" is "rural people cannot pay for them." Aid agency related efforts have tended to break down when the aid donor ceases the subsidy (no matter what the form), and costs have to be borne locally. Impressive, technically sound national programs have frequently fallen behind schedule because those with the "power of the purse" conclude the programs do not represent the wisest and best use of limited national resources, usually tax revenues, i.e., don't "pay off," or "the country can't afford them." The wealthy find ways to get social services; the poor do not. Inadequate social services for rural areas is rooted in inability to pay, i.e., low rural income, or more bluntly, rural poverty. This, I suggest, identifies where the attack must begin in a workable strategy to reach rural folk with what they so badly need.

I mentioned earlier that 20 years ago Community Development (CD) was a favorite of aid agencies. CD did not "fall from grace" because we were unable to assemble effective mechanisms for delivering social services. CD was knocked out of the development "batter's box" by ministers of finance and national planning organizations when they became aware that delivery of social services to rural areas caused demand for them to skyrocket and the cost was beyond the capability of the economy to sustain. Income was rising much more slowly than demand for services. Politically, few developing countries could take the "heat" from CD.

The world food crisis and the problems associated with social services are intertwined and very similar. Schwartz observed, "The immediate cause of famine is not outright lack of food—,but that the poor have no money to buy it."[7] Food, like social services, flows to those areas and families able to afford it. Solve one problem, and we may find the other one solved too. Searching for ways to reduce the costs for delivering social services, like reducing the cost of producing food, will be helpful, but a much greater impact can be achieved, I believe, by concentrating on the other side of the equation. Of course, the two approaches complement one another, and I am not advocating an "either/or approach."

"The lesson" is that social service delivery must be linked close to income increasing activities. Foreign aid is temporary, and developing countries without great oil (or other) revenue cannot subsidize large numbers of citizens for very long.

IV. The World Agricultural Productivity/ Rural Poverty Crisis

Most of the world's poverty-stricken people are in the agri/rural sector, and the vast majority of the families (70%) in the sector are poverty-stricken[8]. Starvation, suffering and lack of hope from inadequate social services are primarily rural phenomenon, rooted in rural poverty. Throughout the world, low income is primarily a result of low productivity in relation to the human factor, and the least productive tend to be in agriculture. Increasing productivity is the key to both the food crisis and the social services problem.

Haven't development economists always been concerned with increasing productivity? Yes, but when the people most susceptible to suffering are considered, whose production is to be encouraged becomes of equal importance to getting more product produced. Aggregate growth is not enough. And, I suggest it is on this score that the economic and social development professions have miserably failed developing country planners and aid agency policymakers until very recently.

For years the concepts on which many of us relied blinded us to what was happening to the masses of rural people.[9] Developing country economic development plans have largely ignored". . . . that few

people. . . . shared in the (economic) growth process and many . . . suffered an actual reduction in the quality of their life." [10] In four countries in which I have worked in recent years, total agricultural production has increased at a favorable rate, but the majority of the people are relatively worse off today than they were 10 years ago, and the majority of the people in all four countries are rural. On a worldwide basis, I suspect most developing countries face the same plight. (Documentation to this effect is being revealed on an almost daily basis.[11] Until very recently little was done to focus attention on the fact that in many countries at least one-third of the rural population are unemployed and 60–70 percent of the remainder underemployed, and" . . . these people, no longer linked to society through their traditional roles. . . are being shoved to the margin of life. . . . "[12] Until recently the social impacts from agricultural developments strategies directed primarily toward new technology adoption and the use of more capital and labor saving methods were largely ignored.

We are doing better now, but I fear not well enough. The recent Congressional Mandate to AID[13] and IBRD policies [14] are excellent, but impacts badly needed now will lag by several years. Momentum from past policies must run its course. A.U.N.D.P report predicts" . . . wastage of human resources in the agricultural sector in developing countries will increase from about 25% over-all in 1970 to around 30% by 1980. "[15] The situation is frightening and heartbreaking.

V. The Planning Challenge

First, let us recapitulate:

(1) There is no mystery concerning what needs to be done to alleviate the current crises rooted in rural poverty.

(2) The high priority need is to improve the quality of life available to the rural masses.

(3) Both the quantity and quality of social services delivered must be increased.

(4) However, to accomplish this, income in the rural areas must arise, and

(5) Whose income increases is as important as is aggregate growth.

How can the job be done? Within the past two years, a program and project approach which, given good planning and effective administration, rises to the challenge has come to the forefront. It is Integrated Rural Development (IRD).

VI. THE "TIME HAS COME" FOR IRD

The Honorable Sayed Marei, in his presidential address to the World Food Conference, set the stage for a revised perspective for agri/rural planning when he declared old methods for dealing with food problems". . . . have been found inadequate . . . .and we cannot leave. . . . [the food problems] . . . . solution to the . . . . slow workings of the normal development process and existing mechanisms. . . . We must raise the food problem above the [agriculture] sector."[16] President Echeverria (Mexico) has added the capstone, "The coming decades will be dominated by three central problems, food, population growth, and unemployment . . . Only by facing the trinity together will we find solutions. . ."[17] For planners, the keywords are above, and together. IRD rises above the agriculture sector, and brings together the trinity. . . food, population growth and unemployment.

The environment is right for the IRD approach to take firm root and grow. We have finally learned that the dual goals of: (1) increased production, and (2) social justice, in national plans are not only compatible, but are interdependent and must be addressed simultaneously. Without rural development, there can be no sound or substantial overall national development. Whereas it was once believed increasing the productivity of small farmers could not be done economically, the internal rate of return for well managed IRD projects can, in fact, be high. Recent evaluations have revealed the "standard brand" approach used for agricultural development in many developing countries during the past 20 years contains many traps and pitfalls. A well planned and effectively implemented

IRD programme provides the balance needed in goals for national plans, avoids the pitfalls of "standard brand" agricultural programmes, and achieves bona-fide socio-economic development at a cost within the reach of the developing countries.[8] IRD is the great hope of the moment.

VII. IRD DEFINED

As the popularity of IRD increases, there is danger the term will be prostituted to the point it is meaningless. (I recently reviewed a project with the words integrated area development in its title, and it was neither integrated, nor was an area approach used; and another called a small farmer loan project which was for small farmers measured by U.S. and European standards! Both projects were playing on the popularity of terms, but missing in substance).

Jansson, addressing an International Seminar on IRD expressed aims and roles of IRD as follows:

> "Its principal aim is to raise agricultural productivity and to create agriculture-based, non-farm employment, and thus to increase rural incomes.
>
> "At the same time . . . make social services, such as health and education, available to the rural population . . ."[19]

He adds that key elements are: (1) strengthening of local institutions to involve villages more fully; and (2) the integration of the programs of all national departments and general directorates.

VIII. IRD PROGRAM AND PROJECT PLANNING

IRD faces many special problems, not the least of which is the fact that the key to success lies in delivering a coordinated program to the field—something few developing countries can do. (I have observed that the level of development is inversely related to a government's ability to coordinate and deliver programs to the grassroots.) In developing countries, ministries and general directorates are generally vertically oriented, and efforts to cut across their lines of authority fought off with viper-like ferocity. Even after the IRD approach is instituted some agencies will view the program primarily in welfare terms; others think of it as nothing more than a revised way to achieve production targets; and still others view it in political terms. Pulling and tugging, jockeying for position, and using IRD must be expected. Therefore, for the IRD approach to succeed, it must be an integral part of the national plan—supported 100% by national leadership. But equally important, there must be support at the local level—from appropriate units of government, from local leaders, and from the people themselves.[20]

Planning is a very serious bottleneck. Few developing countries have the capability to do a good job of planning IRD programs and projects, partly because such planning is a relatively new phenomenon, and also because it is so complex. At the moment no prescription for who should plan is available, but who can't do it has been outlined, and specifications for an organization that could, suggested.[21] In many countries new, or drastically revised, planning organizations will be required.

IX. GUIDELINES FOR IRD PROJECT PLANNING

While much remains uncertain about IRD planning, experience to date does provide guidelines which will help planners keep on target and avoid known pitfalls. They are:[22]

1. Make a "people orientation" the key theme in all planning.

   This calls for planners to think in terms of utilizing physical resources to meet human needs, and not the reverse, as so frequently is done. Physical resources are important only as they relate to peoples' welfare.

2. Plan projects on an area basis.

   Use the resources of the area as much as possible for the benefit of the people of that area. Mass Shifts in population are not in the cards in many developing countries; therefore, assume future increases in population will have to be productively employed and receive social services within the area.

3. Express project objectives in socio-economic terms.

   This will guarantee that the ultimate goal of improving overall welfare will not be overlooked or short-changed. It establishes a sound basis for evaluating porgress, and helps avoid confusion between the means for reaching a goal with the goal itself. (The production oriented ministries and agencies, such as agriculture, whose services are vital to increasing productivity are prone to confuse means and ends in projects).[23]

4. Make increasing agricultural productivity the "hard core" project activity.

   There will be exceptions, but subsistence food production will be the most important economic activity in most project areas. Rapid increases in productivity generally can be achieved at reasonable cost if projects are well planned, and managed. Benefits accrue to a wide base of recipients. Agriculture is the logical "starting place."

5. Make activities that improve the quality of life an integral, equal partner in projects.

   Coordinating the delivery of social services with increasing productivity will provide incentive for rural folk to produce more and remain in the area. Tying increased amenities to increased output will hold program costs within the capability of developing countries, and even states (provinces) within national borders. This makes the IRD approach "salable to ministries of finance and national plan organizations.

6. Make full use of local leadership and involve the local people.

   Projects prepared outside an area and carried out by those within the area are prone to fail. Recent worldwide experience indicates involving local people is mandatory.[24]

7. In all aspects of project planning, search for ways to obtain high returns (benefits) from limited resources and factors.

   Search out the constraints, and remove them. Emphasize self-help activities. For agriculture and efficient system for delivering in a coordinated manner all of the inputs and services required for the small farmer to become more productive must be established. The keyword is coordinated. Groups, such as cooperatives, will have to be used.

8. Integrate the establishment of local industry and service organizations in a way that they grow with increased production.

   This will broaden the scope of rural development and effectively integrate agriculture, services and industry. Thus, a dynamic aspect of economic growth is initiated. Marketing of farm products, processing farm outputs, producing inputs, and rendering social services—all locally—are logical starting points for regional development.

FOOTNOTES

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A POSITIVE APPROACH TO THE DELIVERY OF SOCIAL SERVICES: IMPLICATIONS FOR ECONOMIC DEVELOPMENT

BY

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This paper represents an attempt to apply positive methodology to a discussion of the delivery of social services. To do so requires some discussion of the definitions and applications of the words and concepts that will be used. Accomplishing that, we shall consider the implications of the use of positive methodology in reviewing social services and development.

John Neville Keynes distinguishes between a positive science and a normative science stating "a positive science may be defined as a body of systematized knowledge concerning what is; a normative or regulative science as a body of systematized knowledge relating to criteria of what ought to be, and concerned, therefore, with the ideal as distinguished from the actual."[1]

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To prefer "what is" over "what ought to be" or vice-versa, is not the question as far as the individual is concerned. Most of us operate on our dream of what ought to be or perhaps what we think should be. Individual tastes and preferences as to "what ought to be" when utilized by an economist or members of other disciplines, make the resulting decisions, normative decisions. The strength of any discipline, however, is in the positive scientific methodology that is employed by its practitioners.

Policy recommendations based on an economist's perception of "what ought to be" are not necessarily any more or less reasonable than the perceptions of any other citizen. On the other hand, an economists evaluation of what will happen in an economy if certain courses of action are taken are more valuable than that of others because he (or she) is predicting by employing a methodological approach. On a more practical level, the employment of the positive scientific method means that the economist or planner is capable of presenting alternatives for solving problems, often with some knowledge of the various costs as well as benefits.

It is probably too much to hope that even the most puritan of practitioners would be as detached as in the situation I have painted. Most would become somewhat normative because they feel strongly enough on issues to at least suggest courses of action that are favored by them, and quite likely a great majority would consciously or unconsciously lobby for their own point of view.

If this be the case, if all persons are inherently normative, what value does a positive methodology have? Basically, I believe it is the control, in some instances the brake, over a practitioner to keep his analysis objective. It motivates him to attempt to employ empirical testing to support (sometimes destroy) a theoretical hypothesis. Most of all, it separates the practitioner of a positive science from other persons who engage in the formulation of solutions to problems or in plans for change because the use of a positive methodology forces the practitioner to be objective.

Applying positive methodology to social services and development requires rigorous definitions of these terms. For this paper, social services shall mean any collective action to aid individuals which is undertaken by any other individual or organization, either government or charitable, for which there is not a market-valued payment in return. In essence, social services are goods and services delivered to one group for which another group pays, and, therefore, are a form of income redistribution. The desirability, or more appropriately, the efficiency of such a form of income redistribution depends upon the goals set up and assumptions made by the architects of such a system.

Since this paper deals with development, the goal of income distribution will be economic development.

Development in economic terms can mean economic growth as measured by a real net national product figure. Of more obvious concern, of course, is the amount of real net national product per person; therefore, real per capital income increase is the definition of development used in this paper. Often it is pointed out that real per capital income does not measure the so-called quality of life and that concentration on net national product figures obscures the truth. Although a valid argument in one sense, and there are trade-offs involved in development, many "quality of life facets" are included in national income accounting figures. Examples are costly pollution control devices utilized to purify air and water discharges and restrictions on certain production methods for social reasons even though these restrictions increase costs.

Economic development, whether in a so-called lesser developed or developed country, depends on providing greater amounts of capital per worker. The increase can be the result of a decrease of population with a steady amount of capital, an increase in capital with a steady population, a combination of both increased capital and decreasing population or capital increasing at a rate faster than population increase. Increases in the amount of capital come about only as a result of investment and investment can only occur if savings exist. Savings exist only when individuals in society consume less than possible out of their incomes. The difference between income and consumption is savings. The saving can be either forced, such as that which occurs through taxation, government sponsored inflation, or confiscation, or saving may be voluntary.

Economic development then, depends

upon a society's ability to save rather than consume, coupled with its ability to invest that savings in goods and services in amounts sufficient to increase the capital amount per worker, thereby making it possible to produce more goods and services in the future.

The distinction between consumption and investment should be made clear at this time. Consumption is an expenditure for a good or service that will be used up in the current time period without aiding in producing additional goods and services. Investment is an expenditure for a good or service that will be used in producing additional goods and services.

The prerequisites for development through the delivery of social services are three.

First, it must be domonstrated that redistributing income through the mechanism of social services, or in other ways, brings the desired results, i.e., fulfills the goals more efficiently than the market system alone. Serious thought should be given as to why the service which will be delivered socially is not being delivered in the free market. If it is because of maldistribution of income, that is, desire for the service exists but income levels are not high enough to support it, it may be possible to merely transfer income. If tastes and preferences are such that the service would not be purchased even if incomes were transferred, a case can be made for society delivering the services socially.

Second, for social services to contribute to development, the social services have to be of an investment nature. In other words, the provision of the social services must contribute to the production of more goods and services, rather than simply being consumed.

Third, there must be a way to measure the return from the investment in social services. That is, you must be able to measure the rate of return on the investment in the social service in forms of resultant economic growth.

Each proposal made to socially deliver services thus can be analyzed in the following manner.

To begin, careful consideration should be given to whether the existing system of providing the services in the free market is more efficient in promoting economic development than what is being proposed. As a side note, let me emphasize that efficiency in this instance consists of efficiency for the system, not for a specific individual example. Individual examples are never a basis for promoting any form of income redistribution.

Next, any proposed program has to be analyzed to determine if it is of an investment nature or is strictly consumption oriented. This is not to say that a society should not choose to deliver social services that are totally consumption. It should only be realized that such services do not contribute to economic development.

Lastly, an evaluation method must be set up to determine if the return on investment is at least equal to the return from competing uses of the resources. A program of social services that does not provide a market rate of return is a questionable way to expend a society's resources. To be even more specific, let us take some examples of what a positive approach would mean in analyzing a proposal. For example, delivery of health care to elderly persons, while admirable in humanitarian terms, does not contribute to economic development. It is a redistribution of income for consumption purposes. It should be noted, however, that it is perfectly logical for society to vote into being such schemes because of option demand. That is, most persons expect to grow old and perceive such a system as desirable. Nevertheless, it is not investment.

A positive example would be a birth control program in an underdeveloped, highly populated country. Therefore, income redistribution alone probably would not bring forth the desired level of birth control to have rapid growth. The return on such an investment would be very high, with per capita incomes rising much faster than if the program had not been instituted.

For countries attempting to develop, the situation becomes more crucial. An undertaking of consumption-oriented social service programs requires a surplus; a level of saving (non-consumption) sufficient to carry out desired investment and support the consumption of persons whose marginal product is less than their consumtpion. Underdeveloped countries, seldom, if ever, have such surplus. The exception is, perhaps, a country with an extractive resource such as oil or mineral ore of a magnitude which is large relative to the size of the population of the country. Consumption-

oriented social services in this case retard the country's economic development—something most can ill-afford, if they are to gain on the rest of the world, or even maintain the status quo.

Underdeveloped countries are not the only candidates for study. Developed countries make the same decisions on a different level. One good example of a collective choice for large amounts of consumption-oriented social services is Great Britain. Many of its existing problems stem from a continuing preference for consumption services over investment services.

Africa presents an interesting situation of a test continent with countries in varying degrees of development, and different systems of government. There are obvious differences in natural resources which will give some areas a competitive advantage, but one of the crucial factors in Africa will be the ability of those governments to resist pressure to use government expenditure for consumption-oriented social services, instead of the investment services, such as birth control and education.

There is an incentive for preferring investment-type social services rather than consumption services when such services are financed through inflation. Grovernments historically have had difficulty in collecting taxes in amounts sufficient to meet expenditures. This had led them to print extra money to produce these revenues, thereby causing inflation. To the extent that the increases in the money supply are used to finance investment rather than consumption, society is not as bad off as if the money increase had been used for consumption. When inflation results from investment-type social services, it brings about forced savings, which are invested, bringing forth greater amounts of goods and services in the future. Inflation still has the obvious bad side effects, but it is less ominous because of the investment that has been made. Consumption expenditures financed through inflation have all the bad effects of inflation plus no prospects of increased goods and services in the future.

In summary, it is important to note that I have not suggested that economic development should be chosen over non-economic development nor that investment social services should be chosen over consumption social services. These policy choices are to a great extent political decisions. What I have suggested is that if the goal established for a country is economic development, the use of positive methodology will show that investment social services are the only social services that will contribute to that goal.

[1]John Neville Keynes, *The Scope and Method of Political Economy* (New York: Agustus M. Kelly, 1963), pp. 34–35. See also Milton Friedman, "The Methodology of Positive Economics", *Essays in Positive Economics* (Chicago: The University of Chicago Press, 1953), pp. 3–43.

PLANNING MODELS FOR ANALYSIS AT NATIONAL LEVEL AND WITH DETAIL AND FEEDBACK ON INTERREGIONAL AND LOCAL AREA BASIS

BY

EARL O. HEADY*

Initially, development or planning studies concentrated on separate but distant realms. At one extreme, they tended to be entirely macro oriented, with a few equations and a few variables aggregated at the national level, suggesting sweeping changes or directions of aggregate development investment at the national level. At the other extreme were rather small (India an exception) local farm management surveys which quantified well potentials at the district level but provided little insight for needed developmental programs, investments and directions at regional or national levels. There are, of course, currently a rather broad set of analytical approaches and modeling alternatives for evaluating and recommending development planning and improvement of the agricultural sec-

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tor. This set includes various types of statistical models for estimating demand and commodity market structures (usually necessary ingredients for other national models), econometric simulation models, systems (engineering models) input-output models, linear and non-linear programming models and others. We make use of all of these in our domestic research program but find particularly useful those which allow simultaneous analysis at regional, subregional and national levels. Models such as these require large detail and time for completion, but I velieve are essential over the long-run for countries which wish plans and development which are consistent with the resources and equity of all regions and income strata of the country. Probably the optimum models with these characteristics are those of the mathematical programming family. Initially, as a first generation development, they need to be linear programming models because of limitations in data, computer facilities and time for getting analyses completed and recommendations made. Later generations can be represented by recursive, quadratic (e.g. demand functions incorporated) and other characteristics. Also, components of various types or families of models can be linked together for analysis purposes. For example, we are in the process of linking together our U.S. programming model of 1,891 land areas, 223 producing regions and 51 water supply areas with our recursive time series simulation model. Similarly in Thailand, we will be ready in a few months to link our 76 region (effectively so in soil groups) programming model with our macro time-series econometric model.

Models other than programming models can be used to provide some regional detail. For example, we are developing a recursive, time series, econometric simulation model for the 10 production regions in the U.S. In a few other simulation or econometric studies, the agriculture of a country has been divided into two or three regions representing land of different characteristics and is given the label of "an interregional model." However, it seems to me that such a label is hardly justified when the land of an entire country is simply broken into categories such as (a) cropland or noncropland, (b) paddy land and nonpaddy land, (c) cultivated land, pasture land and reclaimable land. In fact I don't even classify our 10 production region simulation model underway to be one which places sufficient emphasis in natural resources by their detailed and relevant strata over the country.

Limitations in Macro National Models

Macro models specified with equations and variables at only the national level have extreme importance when they are used for the economic or developmental analyses and planning for which they are adopted. Adopted uses include those related to trade policy, inflation and price level control programs, capital allocation and investment among very broadly defined economic sectors as a whole. But while they have useful functions at the national level, they provide limited, and sometimes misleading, detail on the "what", "how", "where", and "when" to develop agriculture under limited capital and skilled manpower resources.

Of course, the broad set of tools available at the national level also is abailable for analysis of a single region where there is little interest in its subregional stratification. Since this is obvious, I will not dwell on regional development models per se but instead will emphasize those which are simultaneously regional, interregional and national in scope, output and results. An interregional programming model can, of course, have regional focus. In Thailand for example, we specified and quantitatively developed 19 regional models as separate entities first, then linked these together into one national programming model. (Actually, the national model was made up of around 76 land resource regions since we designated 3–5 land areas separately in each region.) Analyses were made for each region separately. (This is only a fraction of the regional economic modeling to be accomplished.) However, then in linking the 19 individual region models (and the several land areas within each) we have a model which not only provides national results but also supplies region-by-region results simultaneously. The model expresses completely the interdependencies and interrelationships between nation and region but also among geographically separated regions and even among rather small and spatially separated land resource groups. The models can show not only the economic and social impact of a particular national model on each region but also can indicate the impact and tradeoffs at the national level (or at the level of other distant

regions) when a particular policy restraint is imposed in a particular region to attain specific economic, social or political goals for it.

These are relationships and findings which cannot be attained by (a) policies which give little heed to disparities and inequities brought about among regions as particular policies and development programs are pursued, (e.g. such as new wheat and rice varieties for some regions of India but nothing for other regions) or (b) macro research models which deal only with variables at the national level—or at best divide the nation into two broad types of land. By using models which simultaneously generate national, regional and local resource area results, we are able to establish quantitatively the tradeoffs among such things as interregional income redistributions, optimal interregional commodity and development (capital) allocations, optimal interregional water allocation, effects nationally or consumer food costs, identify specific problems and restraints, to development in individual regions, national farm commodity prices, regional farm incomes, etc. In our Thai modeling, for instance, we are able to include minimum restraints for improving income and employment for the northeast and evaluate the impact in GNP sacrificed if developmental capital is diverted from other areas such as the South. By inserting a mixed integer module, we are able to determine whether a given investment fund should allow greater research and extension in region 4, a dam or two proposed by the World Bank on a particular soil type in region 11, a water distribution system for dams already built in this region are in other regions but without water distribution systems (as is a fact), a push in developing industrial export crops such as palm oil, rubber or fishing (and the handling and processing facilities for them) in region 19 in the South etc. Thai officials also are interested in export diversification and a greater penetration beyond the world rice market into the maize, soybean, rubber, kenof, palm oil and fish markets. Setting particular export goals for such crops, the model should be able to indicate where the increments in output of each crop might best be made. Also, program requirements (capital, extension knowledge, storage and processing facilities, etc.) can also then be determined.

If a country is to have an efficient development plan it needs analyses and models which can provide these detailed answers on "what", "where", and "how much". Just the quantitative answer from a macro model that GNP of a country will be increased more by investing in agriculture than in fishing or a particular industry group gives little guide to "what", "where", "how", and "how much" investment should be made. Even a national regression model that shows a return of 80 percent for a variable approximating technical improvement (i.e. research) in agriculture says nothing about which commodities, locations, soil types and water supply areas where the investment should be made. A model specified and estimated at only the national level, or best for two or three land classes stretching over the entire nation, more nearly generate "quantitative results", or a broad ordering of potential development programs and investments. It can say more should (or should not) be invested in agriculture, but it tells nothing about "what", "where", "why", "how", "how much", etc. Programming models perhaps because of data reasons, are best adopted in getting down to detailed planning which does relate to "what", "where", and "how" for a large number of regions. If someone can come up with a regression or econometric model which serves thus for a large number of regions, incorporating linkages or interdependencies among regions and between region and nation, I will jump up and cheer and go to work with them immediately. But I don't see this as a near-at-hand development, especially for time series—econometric models or even for systems (engineering) simulation models because of the massive data and program needs (although I fully use these methods and models where they are manageable and applicable).

I believe that over the long-run, nations which want to do detailed planning—surrounding the whole of agriculture, generating local results simultaneously with national outcomes as different alternatives might be followed and indicating the "what", "where", "how", and "when"—will turn more to programming models for these detailed purposes (without any necessity to abandon macro econometric models at the national level to provide quantitative useful and necessary results at this level of aggregations). Sure, data problems prevail here also. But they can be overcome rather readily if relevant govern-

mental institutions dealing with agricultural statistics and economic analysis are brought into tandem. For example, our Thai model, with sample surveys designed for the specific purposes and coefficients derived from them accordingly, was completed, in first generation, in 18 months as a simultaneous national and interregional model-linking around 76 land resource areas, 19 civil regions and allowing analyses of integer investments and of specific development possibilities of each of the 19 regions. This is, of course, the first generation of a series of programming models which will develop over time. To some persons, the model developers per se, the task is to develop or apply a model, report it, then abandon it and move on to other areas. In contrast, models which are designed and have goals for continued use in aiding policy choice, in evaluating tradeoffs among alternative futures or scenarios need to go through a continued evolution. Our current Thai model was thus generation 1, and included only crops. Generation 2 will include livestock also while generation 4 will include demand functions for important crops in a nonlinear objective function. A later generation will include a farm simulator—to indicate results for different sizes and types of farms in the various regions and land resource areas as different policies or investment strategies might be tried. Later generations, hopefully developed over the years, will add other realistic specifications.

Model Illustrations

As illustrations of these types of models, I use one of Thailand and one for the U.S. I only sketch the specification or construction of these models and do not illustrate the analysis interpretation of their output. We have many reports detailing results for use by policy makers and the general public.[1]

Thai Regional, Interregional and National Model

As was mentioned, the national Thai programming model was built up region-by-region. Each of the 19 regional models then could be used for analysis of opportunities in that region. The objective could be maximization of income and/or employment, production increases or other quantitives. Different soil areas were identified in each region to effectively expand the model to 76 land regions. While the Iowa State team initiated the regional modeling efforts in August, 1973, Thai research workers in the Division of Agricultural Economics (DAE) were able to do regional modeling by February, 1974. While demands were defined for each region, national demands and a transportation submodel was inserted to cause each of the 76 land regions and the 19 conventional regions (summations of Changwats or civil divisions) to become interdependent in building the next 5-year plan or in evaluating various alternative policies or scenarios for the future.

Figure 1 shows the location of the 19 convention regions (which are further divided into land resource regions). To illustrate the construction of the generation 1 model, we will summarize only equations (restraints) and variables (activities) for region 6.

Restraints (Equations)

Region 6, (composed of Changwats Loei, Phetchabun, Nakkon, Sawan and Uthai Thani) as typical of other regions although there is variation from north to south in land groupings and crops produced includes the following equations or restraints:

1. Type I land: paddy land suitable for production of one broadcast rice crop per year because of high and unmanageable water.

[1]For example, see Heady, Earl O.; Madesen, Howard C.; Nicol, Kenneth J.; and Hargrove, Stanley H. *Agricultural and Water Policies and the Environment: An Analysis of National Alternatives in Natural Resource Use, Food Supply Capacity and Environmental Quality.* Center for Agricultural and Rural Development, Iowa State University, Ames, Iowa. June, 1972, Sonka, Steven T. and Heady, Earl O. *American Farm-Size Structure in Relation to Income and Employment Opportunities of Farms, Rural Communities and Other Sectors.* Center for Agricultural and Rural Development, Iowa State University, Ames, Iowa. June, 1974. Nicol, Kenneth H.; Heady, Earl O.; and Madsen, Howard C. *Models of Soil Loss, Land and Water Use Spatial Agricultural Structure, and the Environment.* Center for Agricultural and Rural Development, Iowa State University, Ames, Iowa. July, 1974. Heady, Earl O. and Thomas, Dennis L. *Alternative Crop Exports, Land Use, Production Capacity, and Programmed Prices of U.S. Agriculture for 1975.* Center for Agricultural and Rural Development, Iowa State University, Ames, Iowa. October, 1974. Sonka, Steven T. and Heady, Earl O. *Income and Structure of American Agriculture Under Future Alternatives of Farm Size, Policies and Exports.* Center for agricultural and Rural Development, Iowa State University, Ames, Iowa. February, 1975.

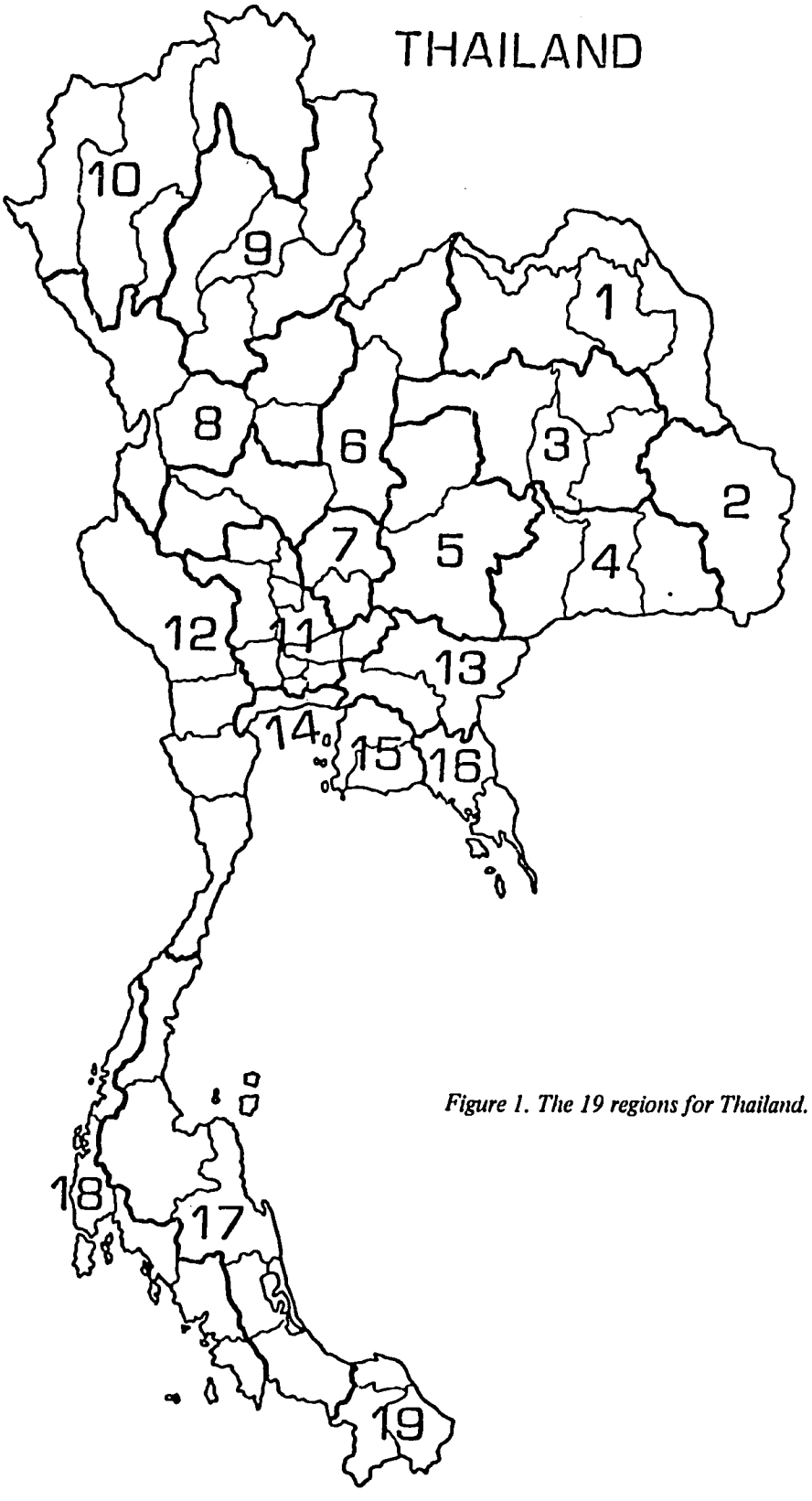

Figure 1. The 19 regions for Thailand.

2. Type II land: paddy land suitable for production of rice, with water management facilities for supplementary irrigation and for production of a second rice crop or several crops of vegatables.
3. Type III land: upland paddy land suitable for broadcast or transplanted rice without irrigation.
4. Type IV land: upland paddy land with inadequate water for rice and no irrigation adopted to other crops.
5. January labor
6. February labor
7. March labor
8. April labor
9. May labor
10. June labor
11. July labor
12. August labor
13. September labor
14. October labor
15. November labor
16. December labor
17. January capital
18. February capital
19. March capital
20. April capital
21. May capital
22. June capital
23. July capital
24. August capital
25. September capital
26. October capital
27. November capital
28. December capital
29. Demand for nonglutinous rice
30. Demand for glutinous rice
31. Demand for human maize
32. Demand for livestock maize
33. Demand for mungbeans
34. Demand for sorghum
35. Demand for soybean
36. Demand for groundnut
37. Demand for sesame
38. Demand for sugar cane

Separation of labor and capital by months was necessary somewhat because supplies vary somewhat among these periods but more particularly because opportunities for multiple cropping require that monthly resource supplies be specified in order that crops of different cropping seasons can compete for them on a monthly basis.

Generally, subsistence demands also have been defined for specific crops in each region. In region 6, it is unlikely that any farmers are going to specialize so highly in corn, cotton and soybeans that they won't grow rice for home consumption.

Activities in generation 1 model for region 6

As mentioned previously, the generation I model included only crops. Phases or generation 2 which includes crops and generation 3 which includes a mixed integer component to allow investment in specific developments such as a dam or a water delivery system in various but specific locations are already underway. The crop variables or activities in the generation 1 model for region 6 are:

1. Non-glutinous rice, native variety broadcast on type I land, grown June to January.
2. Glutinous, native variety broadcast on type I land, grown June to January.
3. Non-glutinous rice, native variety transplanted on type II land, grown June to December.
4. Glutinous rice, native variety transplanted on type II land, grown June to December.
5. Mungbean, on type II land, grown January to April.
6. Non-glutinous rice, native variety transplanted on type III land, grown June to December.
7. Glutinous rice, native variety transplanted on type III land, grown June to December.
8. Non-glutinous rice, new variety transplanted on type III land, grown August to December.
9. Glutinous rice, new variety transplanted on type III land, grown August to December.

10. Tobacco, native variety on type III land, grown November to March.
11. Non-glutinous upland rice, native variety, sown on tyep IV land, grown July to November.
12. Glutinous rice, native variety, sown upland rice on type IV land, grown July to November.
13. Maize feed, on type IV land, grown June to September–livestock or human.
14. Maize, on type IV land, grown July to September–human.
15. Sorghum, on type IV land, grown September to December.
16. Mungbean, on type IV land, grown September to December.
17. Soybean, native variety, on type IV land, grown November to February.
18. Ground nut, on type IV land, grown May to August.
19. Black sesame, on type IV land, grown August to November.
20. White sesame, on type IV land, grown August to November.
21. Kenaf, on type IV land, grown March to October.
22. Cotton, on type IV land, grown July to December.
23. Castor-seed, on type IV land, grown May to October.
24. Tobacco, new variety (Virginia), on type IV land, grown November to February.
25. Sugar cane fresh eating, on type IV land, grown February to January.

26-38. Borrowing capital from institution (one activity for each month).

39-41. Borrowing capital from relative (one activity for each month).

42-54. Borrowing capital from merchants (one activity for each month).

55-66. Capital transfer (one activity for each month).

Dimensions of model

When all of the above equations and variables are considered for region 6, we have a 36 and 66 matrix with the possibility of 2,376 elements in the coefficient matrix, and a number of elements in the restraint vector and objective function paralleling the rows and columns of the tableau.

Transporation variables and export demand restraints enlarge the model even beyond the summation of the 19 regions. Summing the regional restraints, we have 684 equations and summing the regional activities we have around 1,254 activities with a potential coefficient matrix of 857,736 and of the usual density for such a model. With transportation variables and export equations added, the care national linear programming model is around 700 equations by 1,400 variables. As it is used for policy analysis, development evaluation equity considerations (minimum income attainment for some regions) etc., it will be somewhat larger. Further enlargement comes from the generations 2 and 3 models currently under construction which incorporate livestock and mixed integer components for evaluation of specific development investments.

While not of mammoth scope, the local, crop, resource and other detail of a model such as this provides much more basis for guidance and planning of the "what", "where", "how much", "why", or development and agricultural improvement. Perhaps every country has the capability of building such detailed models over a period of 2–3 years. And, as mentioned previously, there can be a transition among generations of models so that initial ones, serving better than nothing or even refined macro models if interest is in regional as well as national detail, can be put to use while more completely specified ones are on the way. As mentioned previously, we plan to link, at its various stages of development, this national and interregional linear programming model of Thailand in recursive form to a macro model of national variables.

U.S. Illustration

Our U.S. models which serve to generate both national and regional data have advanced to fairly high levels of sophistication and detail. Perhaps they can be best used to illustrate potentials in developing countries. We have used these models (a) to determine how the public costs of supply control programs might be reduced when the nation was producing in "surplus" quantities, (b) to determine how

much food can be produced, and under which conditions and locations, if the world is serious about feeding the hungry, (c) to evaluate the future needs of the nation for water and how this water might be allocated among crop regions and farm and industrial sectors (d) to measure the impacts of various types and degrees of environmental and land use legislation on the nation's ability to produce, on the interregional, redistribution of income, on the level of farm income, farm prices and consumer food costs, (e) to assess farm size structure (number and sizes of farms) on regional farm income, income per farm, farm prices, consumer food costs and generation of nonfarm income and employment in rural areas, and (f) other uses.

CARD models

These models now have great detail and power in them. To illustrate their interregional and regional, as well as national, impacts I will summarize one set dealing with environmental policy and land use policy (although the generalmodel can be used for any of the purposes already cited). They were not "built over night" but result from successive generations of programming models built by Heady and associates over a decade.[2]

These models, covering the entire nation but also relating to and producing great detail for individual producing areas and land resource groups, include all agricultural resources and commodities of the U.S. Our major applications is in evaluating different policies and alternative futures in control of the environment through agriculture and land use legislation. These policies relate, at the national level, to tradeoffs between farm commodity prices and income, consumer food costs, the nation's food supply and export capacity, and related variables wich impact with the methods used to manage land and water resources, control runoff or sedimentation and affect water quality through restraints on one in nitrogen, phosphates, pesticides and livestock wastes in agriculture, and restrain nonpoint pollution to different levels. Our models emphasize, on the environmental side, control of sediment delivery or soil loss, reduced inputs and transport of chemical fertilizers and pesticides, and reduced animal waste transport. They measure, in the process of solution, the effect of these controls on national and regional resource and production patterns, resource values, farm commodity prices, farm income, consumer food costs, the nation's export capacity, and the distribution of the costs and benefits of pollution and land use control among regions.

These models include a family of large-scale linear programming models which sometimes have had dimensions of around 10,000 equations and 100,000 variables. These models contain sectors for water, land, crops, livestock (every commodity of U.S. agriculture), several environmental dimensions, a transporation network, regional commodity demand sectors and an endogenously generated resource pricing sector. Because of time limitations we summarize only a soil loss control model or application. It includes 223 producing areas, 9 land classes per area (1,891 actual land resource regions), 51 water supply regions and 30 commodity market regions as shown in figures 2, 3, and 4, respectively.

Model capabilities

The models have the capacity to evaluate simultaneously variables and outcomes in (a) national markets, prices, incomes, and employment; and (b) production patterns, resource use, and economic structure of rather small resource or rural regions, under the posed imposition of alternative policies or futures. We believe that models with these characteristics and capabilities are extremely important for the future as national, state, and local entities evaluate and consider implementation of environmental, land use, water, community development, export and other resource policies and technological restraints related to problems emerging under the nation's advanced state of economic development. Otherwise, the programs and policies imposed by states, municipalities and regional planning bodies will encounter unexpected economic effects, causing them to be nullified because they give inequitable distributions of the costs and benefits of the goals attained. For example, initial solutions of our models pose the certainty that individual states which impose restrained patterns of land use, water runoff, sediment delivery, and technologies will find that, through market impacts, producers and resource owners of other states and locations will realize economic gains while those of the imposing state will bear the costs in lower incomes and reduced resource prices. Even for certain quality controls imposed at the national level, relative returns can be positive in some regions and negative in other regions.

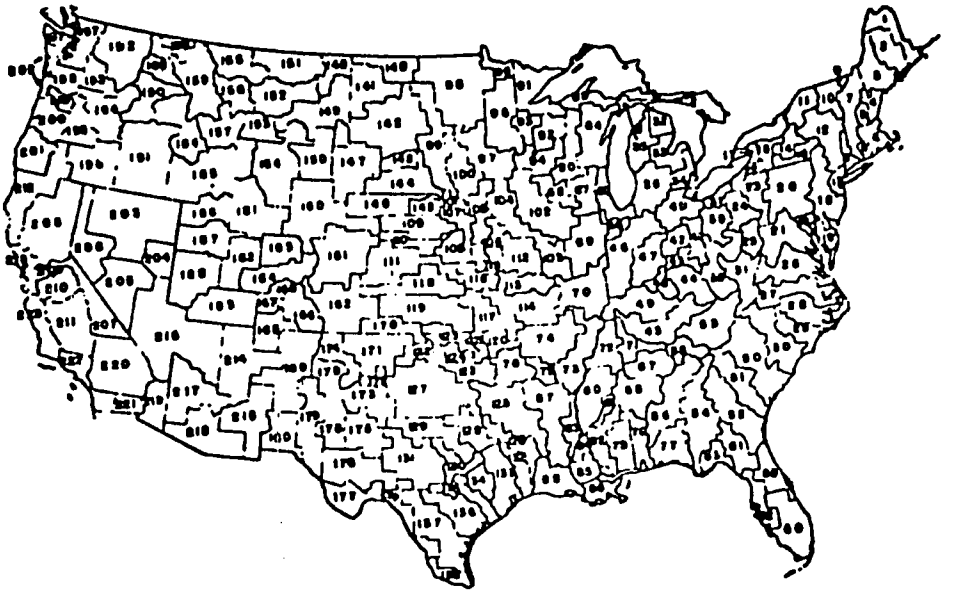

Figure 2. The 223 producing areas.

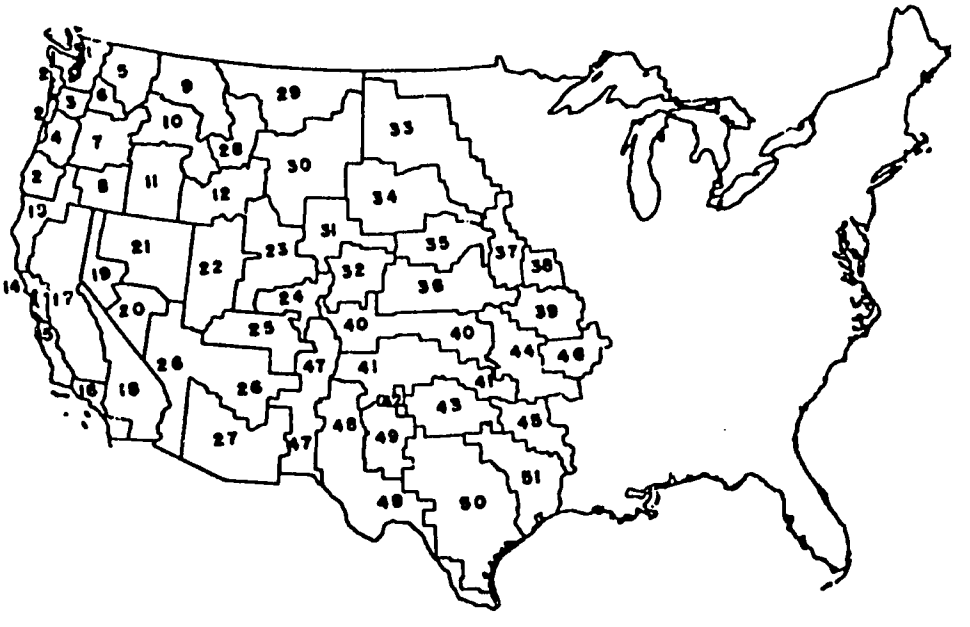

Figure 3. The 51 water supply regions.

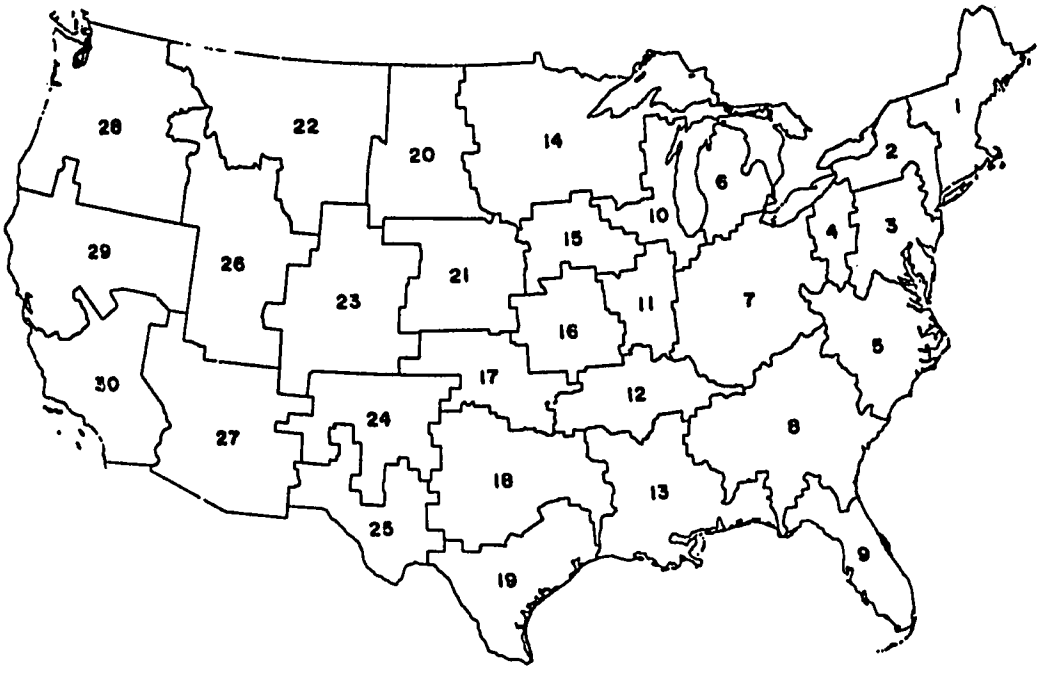

Figure 4. The 30 market regions.

The models can, given various national objective functions and with planning restrained to conform with local goals in land use and technology, trace the impacts back to individual land and water resource regions. Or, conversely, the models also can trace the impacts of plans imposed independently at region or area levels to other regions and to the aggregate national level. Optimal use patterns of land, water, and technology (fertilizer, insecticides, livestock scale, and dispersion, etc.) can be evaluated whether they relate to discrete regulations or to pricing mechanisms imposed by the public. The models under discussion allow examination of the effect of different environmental and land use programs on employment and income generation in rural areas and the potential reflection of these impacts through various agricultural structures as represented by different farm size and employment patterns. We believe these models which specify possibilities and outcomes at both the national and local levels will prove extremely important in future years and decades as the nation and states come to explore and require particular environmental quality and land use controls. The models, which incorporate a transportation subsectors for commodities and water and product transfer activities, allow interdependency among every commodity, in every producing area, and for every water supply in the nation. They reflect comparative advantage in the allocation of land and water to competing alternatives as represented in relative yields, general technologies, environmentally restrained technologies, production costs, transport costs, and imposed environmental restraints. They allow and trace substitution of land at one location for water or land at another location a thousand miles away (or vice versa). Similarly, they allow and analyze these substitutions when environmental limits are applied to restrain the technologies used in any one resource region. These capabilities are necessary if evaluations of national possibilities, plans and policies are to be complete in relation to their impacts and equity in the many rural communities and unique resource areas of the nation.

Nature of Models

The model summarized emphasizes optimal land use patterns, agricultural water allocation, agricultural technology, and soil conservation methods under environmentally restrained soil loss. The objective function in equation 1 minimizes the cost of producing

and transporting commodities among producing and land resource regions of origin, and regions of consumption to meet domestic and export demands. Costs of water consumption and transfer also are included. Activity costs cover all factors except land rents which are reflected in shadow prices, and allow simulation of a long-run market equilibrium for each commodity with a national allocation reflecting the comparative advantage of each of the 223 producing regions, 1,891 land regions and the 51 water supply regions. The objective function is minimize OF where:

$$OFF = \sum_i \left(\sum_k \left(\sum_m X_{ikm} UC_{ikm} + \sum_{nikn} UC_{ikn} \sum_m Z_{ikm} \right) + \sum_p L_{ip} UC_{ip} + DPP_i UC_i \right.$$

$$\left. + IPP_i UC_i + DWH_i UC_i + IWH_i UC_i + FLG_i UC_i + FP_i UC_i \right)$$

$$+ \sum_w \left(WB_w UC_w + WD_w UC_w + WT_w UC_w \right) + \sum_t \sum_c T_{tc} UC_{tc}$$

The variables, parameters, and other terms are defined in a following section.

Variables and equations of the model

Each of the 1,891 land resource groups has alternative crop management systems producing commodities with associated yields and soil loss subject to soil types, average weather prevailing, and conservation tillage practices employed. Data were developed in conjunction with the S.C.S. of U.S.D.A. to represent soil loss per acre under various mechanical practices and rotations or land use systems for each land resource group. Soil loss control alternatives were evaluated through the universal soil loss equations. The equation applied to each crop management system for each land group is of the form SL = K.L.S.R.C.P

where: SL is the per acre gross soil loss; K is the erodibility factor associated with the soil type; L is the computed value relating slope length to soil loss control; S is derived from a nonlinear function relating slope gradient to level of soil loss; R is an index of erodibility for the rainfall of the area accounting for varying levels of intensity, duration and measured rainfall; C is an adjustment factor giving an index of the relative ability of alternative cropping patterns to reduce soil loss; and P is an adjustment factor to account for the potential soil loss reduction from adopting conservation practices.

Each variable represents an alternative crop management system which incorporates a given rotation, crop tillage method and a conservation practice for an individual crop and land resource group. The rotation and tillage methods combine to give the unique C value and the conservation practice determines the P factor. The K, L, and S factors are dependent on the soil characteristics and the regional rainfall patterns determine the R factor.

Per acre crop costs and crop yields were estimated for each alternative crop management systems on each land group. The cost data include depreciation and expenditures on machinery, labor, pesticides, non-nitrogen fertilizers (nitrogen is balanced endogenous to the model), and all other production items for both crops and livestock. Unit costs reflect different efficiencies of farming as land is used with straight rows, contours, strip cropping, terraces and different rotations. The costs also reflect the higher pesticide requirements and lower machinery and labor requirements for crops grown under a reduced tillage cultivation pattern. The costs sum to an aggregate which depends on the particular cropping management system and field technology and when combined with the outputs from the system, reflect the comparative advantage of each crop and livestock system on each land class in each region.

The outputs from the system reflect yields of each crop and the associated quantity of gross soil loss. The interaction within the system also is reflected in a nitrogen balance subsector where the nitrogen flows in the model are examined. The entire cost and yield section of the model is interlocked with alternative technologies, levels of resource input and alternative input uses to meet domestic and export demands. As an example of other interrelationships in the model, consider the nitrogen-fertilizer-crop yield section. Nitrogen available in an indivi-

dual region is an independent variable in the crop yield equation but the source of the nitrogen may vary. It can be supplied from chemical fertilizers, livestock wastes and from nitrogen fixation by legumes. For legumes the amount of nitrogen produced is dependent on their yield which in turn is dependent on the early spring nitrogen availability (through fertilizer) and the non-nitrogen fertilizer avilability over the growing season. The livestock wastes available are dependent on the type and quantity of feed available for livestock and the concentration of the animals in the regiona. Also affecting the yields of the crop is the land class on which it is grown and the conservation and tillage practice associated with the cropping management system.

Both dryland and irrigated crop variables are included for producing regions in the 17 Western States which grow irrigated crops and the model allows selection among dryland or irrigated farming for each region. A range of livestock rations (variables) is allowed in all producing regions since the least-cost feed mix can be drawn from various grain, forage and pasture crops grown in the region or imported (where allowed) from others.

Each of the 223 producing regions has land restraints of the nature indicated in equations 3–9 and a soil loss restraint as in equation 10. We analyzed several levels of per acre soil loss restraints. A nitrogen balance equation, equation 11, and a pasture restraint, equation 23, are included in each region. Each water supply region has a water restraint, equation 13, where the variables and parameters are defined subsequently.

Each of the 30 consuming regions has net demand equations for all commodities as illustreted by equation 14. Regional consumer demand quantities were determined exogenously from geographic and national projections of population, economic activity, per capita incomes and international exports through the region for 2000. All technology and demand coefficients and the solution are for 2,000.

Commodities included in the endogenous analysis are soil loss, nitrogen, water, corn, sorghum, wheat, barley, oats, soybeans, cotton, sugar beets, tame hay, wild hay, improved pasture, unimproved and woodland pasture, cropland pasture, public grazing lands, forest lands grazed, all dairy products, pork, and beef. Also accounted for prior to solution of the model are crops including fruits, nuts, vegetables, rice, flax, and others, and the livestock broilers, turkeys, eggs, sheep, and other livestock.

Dryland cropland restraint, each region by land class:

$$\sum_m X_{ikm}\, a_{ikm} \leqslant LD_{ik} \qquad (3)$$

Irrigated cropland restraint, each region by land class:

$$\sum_n Y_{ikn}\, a_{ikn} + \sum_m Z_{ikm}\, a_{ikm} \leqslant LR_{ik} \qquad (4)$$

Dryland wild hay restraint, each region:

$$DWH_i\, a_i \leqslant ADWH_i \qquad (5)$$

Irrigated wild hay restraint, each region:

$$IWH_i\, a_i \leqslant AIWH_i \qquad (6)$$

Dryland permanent pasture restraint, each region:

$$DPP_i\, a_i \leqslant ADPP_i \qquad (7)$$

Irrigated permanent pasture restraint, each region:

$$IPP_i\, a_i \leqslant AIPP_i$$

Forest land grazed restraint, each region:

$$FLG_i\, a_i \leqslant AFLG_i \qquad (9)$$

Soil loss restraint, each region, each land class, each activity:

$$SL_{ikm+n} \leqslant ASL_{ikm+n} \qquad (10)$$

Nitrogen balance restraint, by region:

$$FP_i + \sum_p b_{ip}\, L_{ip} + EL_{ic}\, b_{ic} - EC_i\, f_{ih} - \sum_k \left(\sum_m X_{ikm}\, f_{ikm} + \sum_n Y_{ikn}\, f_{ibn} + \sum_m Z_{ikm}\, f_{ikm} \right)$$
$$- DPP_i\, f_i - IPP_i\, f_i - DWH_i\, f_i - IWH_i\, f_i - FLG_i\, f_i = 0 \qquad (11)$$

Pasture use restraint, each region:

$$\sum_k \left(\sum_m X_{ikm}\, r_{ikm} + \sum_n Y_{ikn} + \sum_m Z_{ikm}\, r_{ikm}\right) + DPP_i\, r_i + IPP_i\, r_i + FLG_i\, r_i$$

$$- \sum_p L_{ip}\, q_{ip} - EL_i\, q_i \geqslant 0 \qquad (12)$$

Water use restraint, by water region:

$$WB_w \pm WT_w \pm WI_w - WO_w - WX_w - WE_w + WD_w - \sum_{iew} IWH_i\, d_i - \sum_{iew} IPP_i\, d_i \qquad (13)$$

$$- \sum_k \sum_{iew} \left(\sum_m X_{ikm}\, d_{ikm} + \sum_n Y_{ikn}\, d_{ikn} + \sum_m Z_{ikm}\, d_{ikm}\right) - \sum_{iew} \sum_p L_{ip}\, d_{ip} - \sum_{iew} PN_i\, d_i \geqslant 0$$

Commodity balance restraint, each consuming region:

$$\sum_k \sum_{iej} \left(\sum_m X_{ikm}\, cy_{ikmc} + \sum_m Z_{ikm}\, cy_{ikmc}\right) \pm \sum_{iej} \sum_p L_{ip}\, cy_{ipc} \pm \sum_{tej} T_{tc} \pm E_{jc} - \sum_{iej} PN_i\, cy_{ic}$$

$$- EL_j\, cy_{jc} \geqslant 0 \qquad (14)$$

National commodity balance restraints, for cotton, sugar beets and spring wheat:

$$\sum_i \sum_k \left(\sum_m X_{ikm}\, cy_{ikmg} + \sum_n Y_{ikn}\, cy_{iknng} + \sum_m Z_{ikm}\, cy_{ikmg}\right) - \sum_i PN_i\, cy_{ig} - EX_c \geqslant 0 \qquad (15)$$

National export restraints:

$$\sum_j E_{jc} \geqslant EX_c \qquad (16)$$

National import restraints:

$$\sum_i E_{ic+e} \leqslant IM_{c+e} \qquad (17)$$

Non-negativity restraints:

$$X_{ikm}, Y_{ikn}, Z_{ikm}, L_{ip}, DWH_i, IWH_i, DPP_i, IPP_i, FLG_i, FP_i, EL_i, WB_w, WT_w, WI_w, WD_w, WX_w,$$

$$WE_w, PN_i, T_{tc}, E_{jc}, E_{icre} \geqslant 0 \qquad (18)$$

The subscripts and variables for the above equations are defined in the section below.

Subscripts and variables of the model

The subscripts and variables relating to the equations in the text are those which follow:

Subscripts: c = 1, 2, . . . , 15 for the endogenous commodities in the model; e = 1,2, . . . ,5 for the exogenous livestock alternatives considered; g = 1,2,3 for the commodities balanced at the national level; h = 1,2 . . . , 19 for the exogenous crop groups considered; i = 1,2, . . . 223 for the producing areas of the model; j = 1,2, . . . , 30 for the consuming region of the model; k = 1,2, . . . 9 for the land classes in each producing area; m = 1,2 for the dry-land crop management systems on a land class in a producing area; n = 1,2, . . . , for the irrigated crop management systems on a land class in a producing area; p = 1,2, . . . , for the livestock activities defined in the producing area; t = 1,2, . . . , 458 for the transportation routes in the model; and w = 1,2, . . . , 51 for the water supply regions in the model.

variables: a, the amount of land used by the associated activity from the land base as indicated by the subscripts; AIPP, the number of acres of irrigated permanent pasture available in the subscripted producing area; ADWH, the number of acres of dry-land wild (non-cropland) hay available in the subscripted producing area: AFLG, the number of acres of forest land available for grazing in the subscripted producing area; ADPP, the number of acres of dry-land permanent pasture available for use in the subscripted producing area; hay available in the subscripted producing area; ASL, the per acre allowable soil loss subscripted for land class, producing area and activity; b, the units of nitrogen equivalent fertilizer produced by livestock, subscripted for producing area and activity; cy, interaction coefficient (yield or use) of the relevant commodity as regulated by the associated activity and specified by the subscripts; d, the per unit of activity water use coefficient as regulated by the associated activity

and specified by the subscripts; DPP, level of use of dryland permanent pasture in the subscripted producing area; DWH, level of use of dryland wild (noncropland) hay in the subscripted producing area; E, level of net export for the associated commodity in the associated region as specified by the subscripts; EC, level of exogenous crop production by subscripted region; EL, level of exogenous livestock production consistent with the subscripted region; EX, the level of national net export for the subscripted commodity as determined exogenous to the model; f, the units of nitrogen equivalent fertilizer required by the associated activity and specified by thesubscripts; FLG, level of forest land grazed in the subscripted producing area; FP, number of pounds of nitrogen equivalent fertilizer purchased in the subscripted producing area; IM, level of national net imports for the subscripted commodities as determined exogenous to the model; IPP, level of use of the irrigated permanent pasture in the subscripted region; IWH, level of use of the irrigated wild (noncropland) hay in the subscripted region; L, level of the livestock activity with the type and region dependent on the subscripts; LD, number of areas of dryland cropland available for use as specified by the region and land class subscripts; LR, number of acres of irrigated cropland available for use as specified by the region and land class subscripts; PN, level of population projected to be in the subscripted region; q, units of pasture, in hay equivalents, consumed by the associated livestock activity and specified by the subscripts; r, units of aftermath or regular pasture, in hay equivalents, produced by the associated cropping or pasture activity and identified by the subscripts; SL, level of soil loss associated with any activity over the rante m+n in the region and land class designated by the subscripts; T, level of transportation of a unit of the commodity either into or out of the consuming region designated by the subscripts; WB, level of water purchase for use in the water balance of the water supply region designated by the subscript; WD, level of desalting of ocean water in the water supply region designated by the subscript; WE, level of water to be exported from the water supply region subscripted; WI, level of movement of water in or out of the water supply region through the interbasin transfer network; WO, level of water requirement for onsite used such as mining, navigation and estuary maintenance in the water supply region subscripted; WX, level of water use for the exogenous agricultural crops and livestock in the water supply region subscripted; X, level of employment of the dryland crop management system, rotation, in the region and on the land class as designated by subscripts; Y, level of employment of the irrigated crop management system, rotation, in the region and on the land class as designated by the subscripts; and Z, level of employment of the dryland crop management system, rotation, on the land class in the region as designated by the subscripts when the land has been designated as available for irrigated cropping patterns.

Illustration of Results

Solution of the model provides an indication of the optimal land and water use in each producing region and each land resource group at prescribed levels of environmental quality restraints, consumer demand and distribution, export levels, and other policy, market and technology parameters. Our illustration is in the case where the only environmental restraint is soil loss as a means of lessening nonpoint pollution. Phases underway also include limits on nitrates, phosphates and other environmental aspects. The model shows changes which must be made in each of the 223 regions (or even each of the 1,891 land resource groups) if various levels of soil loss control are to be attained. (We have analyzed outcomes when soil loss per annum is set at 2½, 5, 10 and infinity tons per acre.) Changes shown are shifts in crops, the technology which should be used for each crop (e.g. for corn-straight row, minimum tillage, contour, terrace, etc.). It indicates the gain or loss in income by regions and the shadow prices for land and water indicate how environmental and land use policy at different levels affect the value of these resources. At the national level, changes are shown in per capita food costs, the amount of grains available for export, etc. As illustrated in figures 5 and 6, the model can even indicate the allocation of crops, technologies and income among regions as different alternatives in policy are selected.

Lack of time prevents the detailing of other regional, land resource area and national results which can be generated from such models. However, I hope to have illustrated that it is possible to simultaneously analyze national, regional and interregional policies and possibilities in the development of a nation's agriculture or in guiding it in directions of consumers and voters preferences. I believe the extent of detail illustrated for all of these dimensions and aggregations come best from programming models. While these emphasized are linear, we now have a quadratic model nearly operationally perfected. Over time perhaps other types of models can similarly be developed.

Resource Supplies	Type of Constraint	Crop Production Activities on Land Type				Capitol Borrowing Relatives, Institution Merchant	Capitol Transfer	Buf. Wk. Unit	Catt. Wk. Unit	Other Livestock Activities		Activities for Grazing and Feed Processing
		Land 1	Land 2	Land 3	Land 4					Household	Commercial	
Land I	≥	1										
Land II Mar.	≥											
			1									
Land II Feb.	≥											
Land III Mar.	≥											
				1								
Land III Feb.	≥											
Land IV Mar.	≥											
					1							
Land IV Feb.	≥											
Labor Mar.	≥											
		a	a	a	a			a	a	a	a	
Labor Feb.	≥											
Capitol Mar.	≥						1					
		a	a	a	a	−1	−1 1	a	a	a	a	
Capitol Feb.	≥						−1					
Inst. Max.	≥											
Relative Max.	≥					−1						
Merchant Max.	≥											
Fallow Land	≥	1	1									a
Other Grazing Land	≥											a
B.Wk. Unit D.C.	≥	a						−1				
B.Wk. Unit W.S.	≥	a	a	a	a			−1				
C.Wk. Unit D.S.	≥								−1			
C.Wk. Unit W.S.	≥								−1			
Roughage D.S.	≥							a	a			−a
Roughage W.S.	≥							a	a			−a
Processed Feed	≥										a	−a
Crop Residue	≥	−a	−a	−a	−a							a
Subsistence D	≤	a	a	a	a			a	a	a	a	a
Objective Func.		nr	nr	nr	nr	−r	0 0	nr	nr	nr	nr	nr

Figure 5. Generalized matrix of a crop-livestock model for an agro-economic zone.

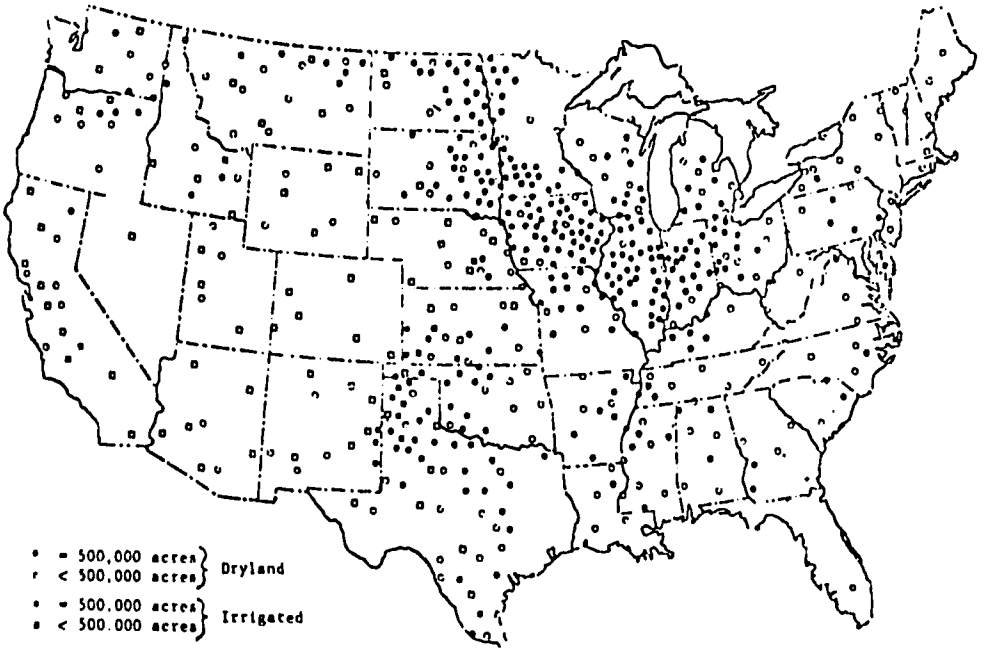

Figure 6. Dryland and Irrigated Crops Distributed Among 223 Producing Regions, No Soil Loss Restraint

DEVELOPING AN ANALYTICAL CAPACITY FOR PLANNING AGRICULTURAL SECTOR DEVELOPMENT

BY

GEORGE E. ROSSMILLER

INTRODUCTION

When one thinks of the wide range in stages of agricultural sector development among countries; the wide range of ideologies and institutions creating the environment within which agricultural sector development is attempted; and the complex vertical and horizontal linkages necessary for agricultural sector development to occur, it may appear presumptious to attempt to say anything of general applicability about developing an analytical capacity for planning agricultural sector development. Nevertheless, while the situation is different from one place and one time to another, enough similarity exists that some generalizations and principles can be drawn from specific experiences which should be useful elsewhere.

Developing an analytical capacity broadly conceived is institution building. The intent of this paper is to examine the problems associated with developing an analytical capacity at the national government level to provide input to the public decision making process affecting agricultural sector development. Certain functions must be performed within the public sector to influence the rate. course, and incidence of this development. Planning is done, policies promulgated, programs developed, and projects conceived, designed and implemented. These functions and activities require that decisons be made, even if by default. But a major reason for the existence of a public sector in any society is to make decisions, hopefully with outcomes

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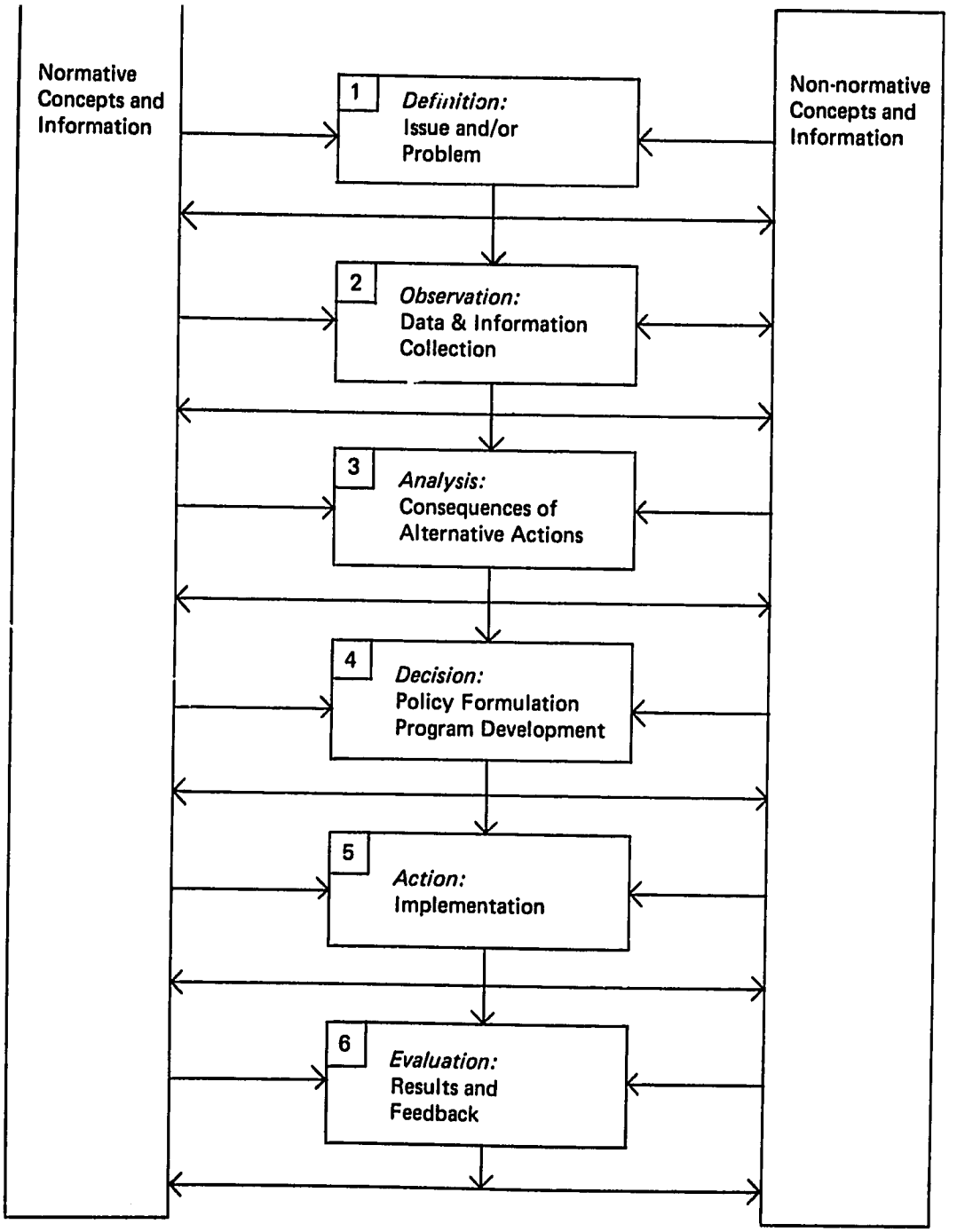

Figure 1. The decision-making process.

more in the public interest than would occur if these decisions were made by default. Some decisions are independent and easy due to limited scope or limited choice of alternatives. Most are complex and interrelated. All can be depicted as a process.

Different textbooks, different authors, and different decision making practitioners will depict the steps in the decision making process in varied but generally similar ways. One such view is shown in Figure 1 as a sequential and iterative set of six steps including: (1) problem or issue definition, (2) data and information collection and observation, (3) analysis to determine the consequences of alternative courses of action, (4) the decision upon a course of action including policy formulation or program development, (5) action, including the implementation of the decision and, (6) evaluation of the results and feedback of those results into the continuous decision process. As part of the process the decision maker must receive a continuous flow of both normative and non-normative data and information processed in such a way as to be useful to him in making his decisions. Since many problems must be confronted in agricultural sector development, many decision makers are involved in a continuous time frame. Thus the analytical capacity flowing into the decision process must be able to deal with the wide variety of problems confronting the decision maker within the dynamic context of time. To assure continuity in the functioning of this capacity over time, it is essential it be institutionalized as an integral part of the decision making structure.

The development of an analytical capacity can thus be viewed as an institution building problem with the implementation of the desire to build such capacity as an agricultural sector development project. The factors necessary to such a project are examined in the remainder of this paper; drawing heavily upon the strengths, shortcomings, and insights gained during the past four years with the Michigan State University Agricultural Sector Analysis and Simulation Project.

This project began in summer 1971,[1] following the completion of an earlier project which terminated in 1970.[2] The objective of this earlier effort was to test the feasibility of using the systems approach and simulation techniques to develop computerized models of an agricultural sector as an analytical tool for planning and policy formulation. After developing a computerized system simulation model of the Nigerian rural sector, we concluded that the general approach was useful as a means of simulating the consequences of alternative proposed policies for agricultural sector development.

The objective of the present project begun in 1971 was to further develop, test, and apply the approach in the decision making structure of a developing country. The field activity of the project in Korea is known as the Korean Agricultural Sector Study (KASS).

The activity in Korea consists of model development, training and organization of an analytical unit with personnel capable of further development and use of the models, and institutionalization of the analytical unit into the agricultural sector decision making structure at the national level. Thus, the focus is on a national level analytical capacity related to agricultural sector development in developing countries. The generalizations, however, apply at sub-national levels and in developed country contexts as well.

Analytical Capacity Development Defined

When viewed as an institution building problem, development of an analytical capacity means also institutionalizing that capacity as an integral part of the decision structure. Thus, in the final analysis this capacity must depend upon indigenous personnel and institutional linkages without direct external support. In the institution building period, external support may be provided by foreign assistance agencies in developing countries, by national government agencies to local government units in developing or developed countries, or by any agency outside of the environment within which the analytical capacity is being established.

In defining what an analytical capacity is, it is instructive to indicate what it is not. When the World Bank sends a short-term

[1] Michigan State University, Contract AID/csd-2975.

[2] Michigan State University, Contract AID/csd-1557.

team into a country to do one of its periodic economic survery updates; when AID assembles a short-term sector survey mission to identify areas for capital assistance investment; when a consulting team is called in to do a benefit-cost feasibility study; or when a specialist is brought in to consult on a specific technical problem such as a livestock disease or a grain storage difficulty, no contribution is made toward developing an indigenous analytical capacity. In each of these cases the parameters of the single problem are prescribed *a priori*, and the objective of the team or the specialist is to move in quickly, gather the secondary data and information necessary to the analysis required, draft the report, and leave. Normally, the only thing left behind is the report and a promise (or threat) to come back if or when needed. While these are important activities in their own right, they are not what we have in mind here.

What we do have in mind is an analytical unit composed of a core of professionals capable of amassing, assimilating, and analyzing data and information within a problematic logic framework in such a way as to provide decision makers an understanding of the likely consequences of possible alternative courses of action. While the analysis will primarily provide information in terms of a wide range of performance criteria on the consequences of alternative courses of action, the information and data and much of the analysis itself must include knowledge from a variety of areas such as the technical level and relationships within agriculture, the economic situation and structure, the social and cultural conditions, the state of human change and the institutional environment, and the political process and constraints. Thus the analytical unit must have the capability of drawing upon the knowledge and abilities of multiple disciplines. And the multidisciplinary emphasis needed will change with the problem confronted.

Necessary Conditions for Analytical Capacity Development

Before an Activity seeking to develop or improve an indigenous analytical capacity can be considered, several prerequisite conditions must hold. First is the recognition by key decision makers that policy and planning objectives are not being fully realized. This may be the case for a variety of reasons including unrealistic objectives, plans and policies which conflict or compete with each other; programs and projects which are not fully implemented; or for other reasons directly attributable to faulty decision making as a result of inadequate information and analysis.

A second and closely related precondition is that decision makers who are unhappy with the development performance must recognize that in part the present level of performance is due to the lack of information and analysis upon which decisions are based. A third prerequisite conditions is that decision makers must have an intent and will to improve the decision process and the decision making structure with a more scientific and analytical approach. And finally, the appropriate decision makers must have the will and ability to commit the resources necessary to such a project. Decision makers may be reluctant to commit to such a project if a credibility gap has developed because analysts have been too narrow in their analyses or obtuse in their contacts with decision makers in the past.

These prerequisites were reasonably well met in Korea in 1971 and have been strengthened since. In 1967, the Agricultural Economics Research Institute (AERI) was established in the Office of Rural Development.[1] It had a farm management orientation geared to providing micro-economic input into the technical agricultural research program.

In 1970, AERI was removed from the Office of Rural Development, physically moved from Suwon to Seoul, and placed as a staff unit in MAF under the Vice Minister. Its new charge was to provide MAF with economic and policy analysis input, mainly of a "brush fire" nature.

By summer 1971 when the MSU project was installed with AERI as the counterpart agency, AERI still had a strong farm management orientation and had not yet established itself as a capable, creditable, policy analysis unit within the Ministry. Linkages with the decision makers were not well developed and lines of responsibility and authority ambigious. Analytical assignments were not well

[1]Office of Rural Development (ORD) is the technical agricultural research and extension agency of the Ministry of Agriculture and Fisheries (MAF), located at Suwon.

defined nor realistic when measured in terms of output demanded relative to time and resources provided. Coordination and cooperation between the data and information acquisition system, the decision makers, the policy and program implementors, and AERI were deficient. But the fact that AERI was moved to Seoul to function as a staff policy analysis unit indicated that a need for such analysis was perceived by decision makers and that the will was present to take action to fill this need. With time, experience and to some extent through the presence of the MSU project many of the early operational difficulties have been vastly improved. Further improvement is, however, both desirable and possible.

While the unique configuration of institutions and complex of responsibilities, will dictate to some extent the latitude and scope of responsibilities, linkages, and functions delegated to an analytical unit, some basic principles generally apply. Figure 2 indicates a typical conceptualization of the functional linkages necessary to integrate an analytical unit into the decision structure. The analytical unit is shown in the middle with the units providing support and services indicated in the lower part of the chart and the functional units or agencies being served by the analytical unit shown in the upper part of the chart. The 1 in the circle on the arrows depicting the linkages indicates the importance of interaction between the analytical unit and *all* other units with which it is linked. The heaviness of the arrows indicate the likely relative operational importance of the linkage. Finally, the analytical unit is shown to have two sub-units—one concerned with further development, adaptation and testing of the models, techniques, and methodologies used

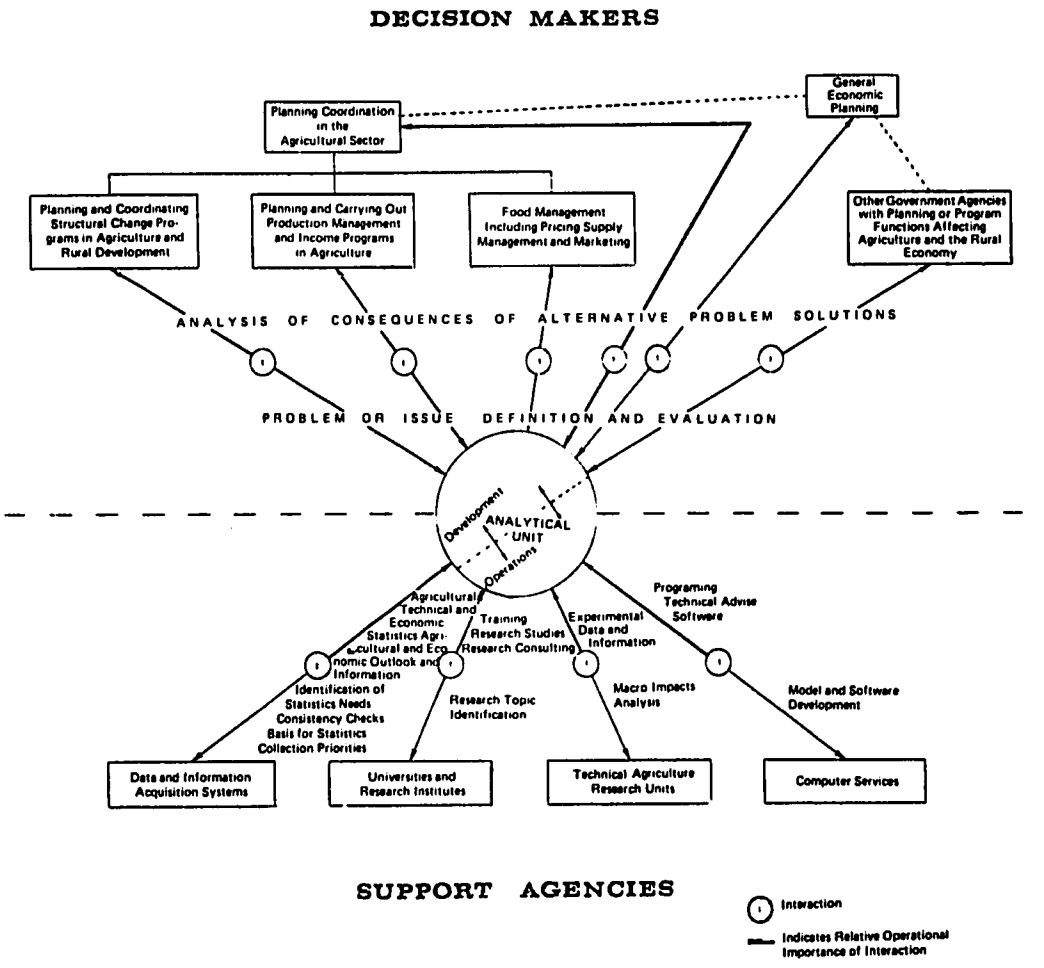

Figure 2. The Analytical unit in the Decision Structure.

in the analyses, the other concerned with operational use of the analytical tools in analyses of problems defined in interaction with the decision makers.

The relationship of the analytical unit to decision makers at a variety of levels in the national government agencies is relatively self-explanatory. A major product of this interaction is a two-way information flow as problem definition, data collection, and analysis takes place. At the general economy planning and the agricultural planning coordination levels the analyses will focus on long term consequences of broad planning and policy strategies. At the agriculture structure, production, and food management levels the analyses will focus on intermediate and short run consequences of policy implementation and program alternatives. Problems at each level must be defined in interaction with relevant decision makers and within the realm of authority of the particular decision maker.

A caveat is necessary with respect to Figure 2. The only part of the decision making system shown is that which impinges directly on the analytical unit. Input to the decision process by the analytical unit is only one of many inputs from a variety of sources. The inputs available from all sources are weighed and sorted, accepted or rejected by the appropriate decision maker for any given decision. For the decision maker is always attempting to satisfy multiple objectives within an arena of multiple constraints, political, institutional, and social as well as economic.

An extremely important supporting service linkage is with the data and information acquisition system. This system whether contained in a single unit or dispersed among several agencies provides an important function of quantitatively measuring the structure, performance, and behavior of the agricultural sector and relevant parts of the general economy. The statistics collected must be processed and disseminated in a form most helpful to the users, in this case the analytical unit and the planning and policy decision makers. To be of most use in the decision process the flow of data and information from the acquisition system must be relevant, accurate, timely, and consistent.

Close interaction between the analytical unit and the acquisition system can provide the basis for data improvement. The analytical unit through the use of their models can provide information on consistency and data sensitivity which can be helpful to the acquisition system in determining what statistics to collect, how they should be processed, and in establishing guidelines for priorities in data refinement for greater accuracy.

The quality of the data and information generated by the acquisition system is vital to the quality of the output to the decision makers from the analytical unit. As indicated later improvement in the acquisition system was determined to be so important in Korea, that special technical assistance is being provided for this purpose as part of the total MSU project. The other support and service linkages are more self-explanatory although more will be said of them later.

It perhaps is unfortunate that the main perspective of the Korean project tends to center on the KAAS models. The objectives of the MSU-AID Contract focus on model development, testing, and application. The attention of interested people, both inside and outside Korea, tends to focus on the models. And project staff tend to put dominant emphasis on the models in their discussions. Admittedly the models are an important component of the project. However, when viewed from an institution building perspective the truly critical aspect is the development of the analytical unit with a cadre of trained personnel capable of using, adapting, and further developing the model as a tool in analyzing a wide variety of planning and policy problems. The most complex and challenging dimension of this process is the institutionalization of the analytical unit into the decision making structure, with appropriate linkages to decision makers and to support and service agencies.

Project staff are often asked: "When will the job in Korea be finished?" "When will the model be completed?" "When will you finish the final report and wind up the operation?" The answer to all these questions is, *"If we are successful, never."* Once the KAAS analytical unit is institutionalized into the decision structure it must continue to be relevant and useful to decision makers to remain an effective part of that institutional structure. It must continually adapt, update, and develop its analytical tools and models as the agricultural system they represent changes. And it

must continue to adjust its abilities to accomodate to the changing nature of the problems confronting the decision makers. Thus the job is never completed, and a "final report" is not an objective.

Role of Foreign Assistance

Only when indigenous decision makers have the will to improve their analytical capacity can enlightened foreign assistance provide the catalyst which is so often needed to bring about such a change in the developing world. This catalytic action can take several forms and perform several functions. The forms include provision of both technical and financial resources, training, and administrative support; while the functions include a focus of interest, an organizational, technical, and methodological ability, and in some cases initial entre to the decision process at levels not achievable by indigenous personnel. Foreign assistance cannot provide the will to succeed; the intimate knowledge of the indigenous situation, institutions, and effective modus operandi; or the indigenous internal linkages necessary for institutionalization and sustained usefulness over a prolonged time period. In any case the foreign assistance will phase out over a period of time (in some cases too quickly, in others not quickly enough) and the indigenous capacity must be able to take over at that point with their own set of linkages and functional relationships intact; otherwise possibly fatal institutional gaps will exist.

In the Korean case, the basic administrative and structural linkages already existed for the Agricultural Economics Research Institute before the KASS project began. The KAAS project was attached to AERI as the Korean counterpart institution and was able to take advantage of this existing set of linkages even though as indicated above they were incomplete and in some cases weak.

On the incomplete list were linkages to computer services and to the research training, and consulting services of universities and other research and training institutes. A satisfactory linkage between AERI/KASS and computer services did not come easily. The first attempt was to use the computer services provided by the National Computer Center, an installation run by the Government to provide services free to government agencies. This computer installation is administered as a data processing center with priority given to large data processing jobs such as survey tabulation or census data processing. The needs of model developers and researchers are not met. At times job turn around time was once a week when a minimum of three times a day would have been more appropriate. Such delays led us to realize that this "free" service had a high opportunity cost in terms of the frustration felt by KAAS team members and in inefficient model development and operation. We finally arranged to use the computer installation at the Korean Institute of Science and Technology on a pay basis with the MSU project, USAID/K and NAERI[1] sharing the cost of the service and the teletype terminal and keypunch machine installed at NAERI. The agreement called for Korean resources to be used for operational activities and MSU and USAID/K resources to provide for model development activities. As the MSU contract nears termination, model development is declining and operations are increasing so the Korean Government is providing an increasing share of the computer service cost.

With respect to the linkage with Korean universities and research institutes, existing linkages were strengthened by providing two universityprofessors with the knowledge of some simulation techniques and the skills necessary to teach the systems approach. After a great deal of groundwork was laid by the NAERI director, a mechanism was established to allow government agencies (like NAERI) to contract with professionals in universities and elsewhere for their services at rates of pay nearer their opportunity cost than the civil service system had allowed. Thus a very good means of upgrading work quality at NAERI was devised.

A major constraint to institutionalizing an analytical capacity for agricultural development planning in the Korean agricultural ministry was identified by the KASS team early in the project. A task force concerned with identifying organizational and functional constraints in MAF to effective planning and policy development found a low capacity among MAF administrators to absorb and

[1]By this time the name of the Agricultural Economics Research Institute (AERI) had been changed to the National Agricultural Economics Research Institute (NAERI) thus reflecting its wider role and responsibility.

utilize serious analytical input to the planning and policy process. Further the analytical work done in MAF was found to be sporadic, piecemeal, and fragmented throughout the bureaus and divisions of the Ministry. This situation led the KASS team to recommend that MAF initiate concerted action to increase the planning and policy development capacity of its personnel in four specific areas. These areas were: agricultural policy analysis, agricultural outlook, program and project evaluation, and agricultural statistics and data collection processing and utilization. Subsequently, a joint project was developed between USAID/K, the Korean Ministry of Agriculture and Fisheries, and Michigan State University to provide technical assistance in these areas under the Korean Agricultural Planning Project (KAPP). While KASS was designed to be developed into an analytical backstopping unit with the capability of using large and complex computerized models for analysis of Korean agricultural development problems, KAPP was designed, in part, to help MAF decision makers identify and interpret their problems in such a way that the KASS unit could help them analyze and derive solutions to those problems. Therefore, KAPP provides the interim linkage between KASS and the decision makers so crucial to the effectiveness of the analytical unit. To insure close cooperation and coordination between KASS and KAPP a single field project coordinator has been designated to administer and oversee the operations of both units.

As stressed above, it is extremely important that the institutional and operational linkages necessary for institutionalization of the indigenous, analytical capacity be

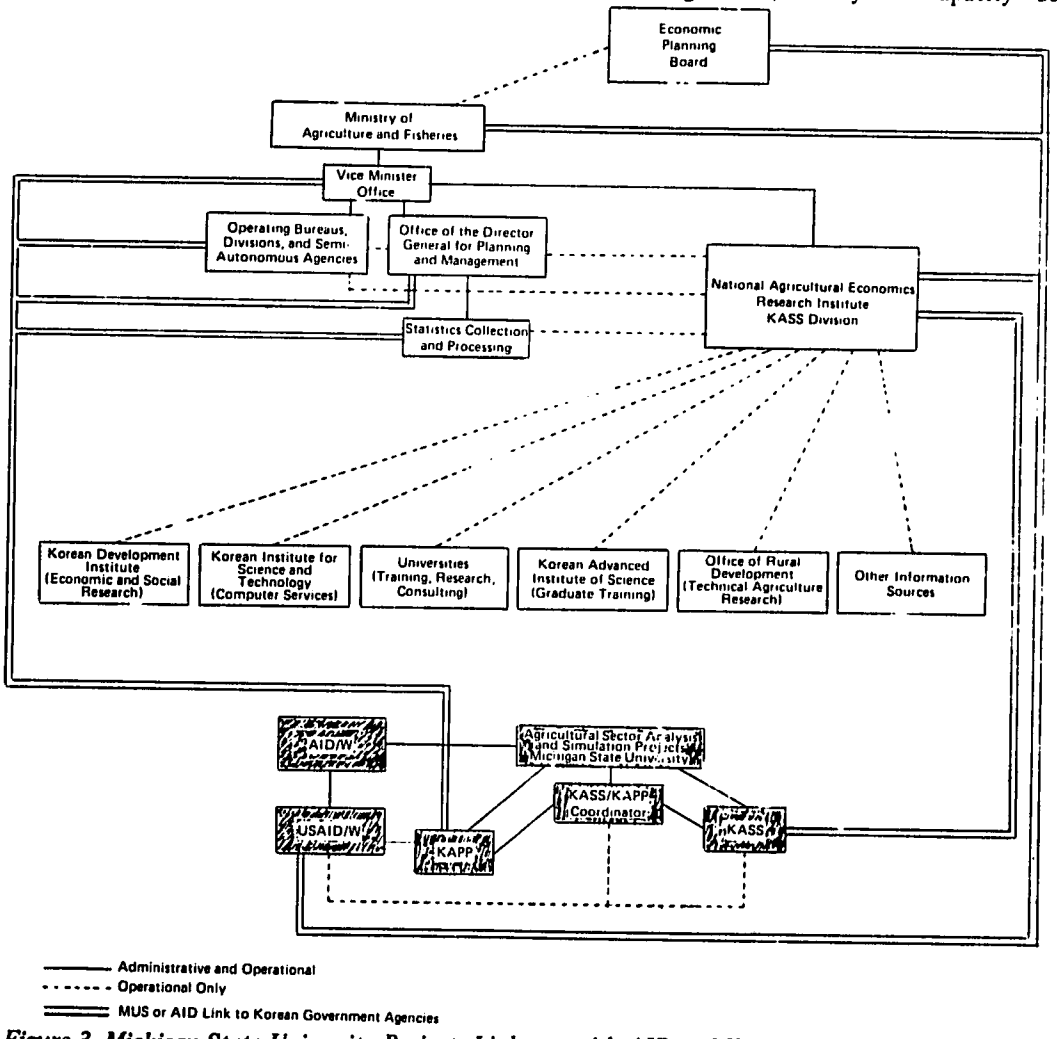

Figure 3. Michigan State University Projects Linkages with AID and Korean Government Agencies.

developed and in place so as to be minimally affected as the foreign assistance effort is withdrawn. Figure 3 indicates the MSU project linkages with AID and the Korean agencies as well as the indigenous linkages which have been established. It is obvious from the diagram that the AID and MSU activities are supportive and integrated with, but not substituting for, the indigenous institutional structure and linkages intact and functioning. This project structure was no accident but rather designed from the beginning in order to insure that the survival of the analytical capacity being built in Korea does not depend upon MSU or AID remaining within the structure.

The main question remining in Korea is whether the foreign assistance projects have been designed to provide enough resources and time for the indigenous structure to be come well established. Foreign assistance efforts are presently scheduled to terminate on the KASS side on 30 June 1976 and on the KAPP side on 30 June 1977. By that time, a small but important number of Korean personnel will have returned from training in agricultural economics and systems science. It will be their task to take over the operation of the analytical unit and to insure the smooth and effective functioning of the unit. However, well trained these professionals will be, they will still be relatively inexperienced and will most likely need some additional outside support through short-term consultation.

The overall process of institutionalizing an analytical capacity in which organizational, technical, and human change are required, often in large amounts, is a risky venture at best for both the host government and the foreign assistance agency. For example, a few months ago a National Academy of Science team spent one week in seminars and workshops with personnel from a variety of indigenous development agencies of a Latin American country. The purpose of this exercise was to think through the establishment of research and operational program priorities for agricultural sector development in one region of the country. Near the end of the week, several of us on the NAS team had become rather disenchanted with the process and were less than happy with what appeared the likely outcome of the conference. One member of the NAS team, Dr. Arthur T. Mosher,[1] attempted to put the whole thing in perspective by observing, "don't expect too much, this is neither the beginning nor the end but only a moment in the continuing process of development activity in this country.'

Viewed in this perspective, it became clear that one could not expect what some of us had hoped for from the conference. Rather the small amount of progress which was made in defining the issues and moving toward establishment of priorities was undoubtedly worth the effort because the next round or the next event in the process would have that much more base from which to start. The same is true in the development of an analytical capacity. The process must begin within the context of a given political ideology, human resource base, technological level, and configuration of instituations and their linkages with each other. And it must also be understood that the foreign development assistance agency cannot provide resources and exert its influence forever. While it is involved, however, one principle is imperative. No matter what the ultimate design and mode of project operation, it must be a joint undertaking with the relevant institutions and decision making personnel of the host country. The foreign assistance agency may be able in its effect on the "moment" in the process to help shape the structures necessary for the continuation of an analytical capacity, but the determination of long-term survival is out of its hands. Unless the project and its process are legitimatized by indigenous decision makers and accepted into the country's culture, tradition and institutional structure, the moment of involvement by the foreign assistance agency will pass with no visible remaining sign that it ever existed. The ultimate test, in fact the only test, of success in developing an analytical capacity is whether the output of that capacity is sought and used over time by decision makers who because of its input, make beter and more effective decisions than overwise would have been the case.

We think that with continued attention and nurturing by MAF and because of the

[1] Former president of the Agricultural Development Council and presently ADC representative in Sri Lanka.

sound analytical base which has been established, the KASS unit will become an integral part of the decision structure for Korean agricultural sector development. But Korea along with probably only a handful of other developing countries is unique. The ingredients of established institutions, of human capacity, of the ability to handle technical change, and of the will were all present when the foreign assistance was provided as a catalyst for developing and institutionalizing the analytical capacity. Only countries with these attributes in strong measure can hope to achieve the integration of an analytical capacity on a large scale. For the less developed of the many developing countries have a long and arduous task ahead of them to develop these basic attributes. Only when this is accomplished can they successfully attempt the next step toward establishing a broad analytical capacity within the decision making structure for better and more effective planning and policy formulation for agricultural sector development.

COMPARATIVE DYNAMICS AND DEVELOPMENT POLICY ANALYSIS: THE RECURSIVE PROGRAMMING APPROACH

BY

RICHARD H. DAY*

This paper outlines the role that recursive programming models can play in development policy analysis. The discussion assumes that agriculture is of special interest but it should be understood that the concepts are applicable to other sectors and to multi-sector studies with appropriate modifications.

I

Economic theorists have often concentrated on the "big" issues of economic development: the long run path of per capita incomes, the existence and character of balanced growth, the intertemporal optimality of alternative growth trajectories. This has led to macroeconomic theories characterized by a few relatively simple, but dramatic properties such as the "iron law of wages" that derived form classic reasoning, or the recently fashionable "golden rules of economic growth " But policy makers and the rank and file civil servants who are charged with implementation often have a different view of development. They have long known that an awareness and understanding of the big issues are not sufficient to guide the host of individual decisions from which they are directly responsible or over which they hope to hold sway through well conceived direct and indirect controls. They have found that sooner or later policies must account for the realities of decision-making in the field and factory. Unfortunately for them, however, little guidance can be obtained from the traditional economic development literature, especially that concerning agriculture, at a microeconomic level. A wide gap exists between the principles of macroeconomic development theory and the practice of policy makers and administrators.

In the meantime various lines of quantitative analysis have emerged that partially fill the requirements for sound policy analysis. One line is the econometric analysis of how the supply of individual commodities responds to prices. This approach incorporates some microeconomic variables such as imput and output prices, crop yields, and weather indexes. It does not, however, examine the performance of the farm sector as a whole. This is a serious shortcoming because farm technology and decision procedures create a variety of interdependencies that must not be ignored if production response is to be understood, *even if one is interested only in individual commodities.*

A second line has focused on regional or national indexes of economic activity of the farm sector as a whole, incorporating output indexes, average wages, aggregate labor supply, and the interdependence of such

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This paper is based on material presented in R. H. Day and I. Singh, *Economic Development as an Adaptive Process:* A Green Revolution Case Study, Cambridge University Press [forthcoming].

aggregates with similar indexes for the non-agricultural sector. While such studies are often well conceived, especially from the point of view of macroeconomic issues, they subsume the intrasectoral allocation of scarce resources among interdependent outputs.

A third approach involves input-output and national programming models. It emphasizes intersectoral structure and has been motivated by policy issues dealing with resource allocation and factor mobility among various industrial sectors and agriculture. Models of this kind have yielded substantial new insights and have introduced a new level of rigor into intersectoral analysis. Yet, they leave out the details of technology and decision-making within individual sectors that must be introduced eventually if the policy maker is to receive guidance at the level where his policies must ultimately be put to work (and, moreover, where his success or failure will ultimately be judged by the people). Even when considerable microeconomic detail is incorporated essential institutional and dynamic features of microeconomic reality are left out. This suggests the need for augmenting approaches that concentrate on the details of intrasectoral development, and fill the gap still remaining when the methods just described have been skillfully and effectively implemented.

A fourth approach, variously called the "general systems" or simulation approach can allow for intersectoral relations while at the same time accomodating any amount of microeconomic and dynamic detail. It can draw on virtually any particular modeling technique. A more specific, but still very flexible, class of models that falls within this general category is the "recursive programming model" which builds on explicit assumptions about how decisions are made at the microeconomic level and that incorporate dynamic linkages fundamental to the ongoing process of change.

II

Until recently it was argued by many, and with great force, that people in various societies behave according to rules so different that microeconomic theory is not relevant. Proponents of this view held that the people of less developed countries are tradition bound, that cultural and institutional restraints severely circumscribe their responsiveness to market incentives, and that the developed countries have a kind of monopoly on "economic man". However, in 1964 Theodor Schultz argued that traditional patterns were maintained not because of hidebound restraints but because they represented a rational equilibrium under existing conditions. His proposition has been confirmed by a variety of statistical studies of supply response. These studies have focussed on the question of whether or not peasants in traditional or near traditional agriculture respond to opportunities which are made available by changes in market conditions. They have shown that the production of specific commodities in specific LDC's is price responsive, especially when adjustment lags due to uncertainty and fixity of capital stocks are accounted for. Moreover, they suggest: (1) the general form and direction of this response is consistent with price theory; and (2) peasants in traditional agriculture respond to market incentives when sufficient incentives exist.

In the standard economic analysis firms maximize profits, households maximize utility. When faced with risk they maximize expected profits or expected utility. This analysis was worked out for the agricultural setting long ago by Heady, and more recently, for the peasant farm, by Nakajima. It has been successfully incorporated into econometric studies by Lau and Youtopolous, among others. Unfortunately, this neoclassical model underplays the complexity of technology, it overplays the rationality and perfect knowledge of farmers; and it exaggerates the efficiency of markets. It is designed for comparative statics: the study of how equilibria vary with parametric changes in the data of the problem. It is essentially a theory of economic processes in equilibrium.

Economic development, however, involves the disruption of old equilibria and the seeking of new equilibria. *Whether or not new equilibria are reached and the specific time path toward them depends on the way decisions are made, and how the economic behavior of individuals interact to produce aggregate results.* But to understand economic development as a disequilibrium process, we must construct a new microeconomic model of decision making. It would seem appropriate to name the arch-typical decision-maker in disequilibrium, "adaptive man". Adaptive man is an agent who makes short horizon

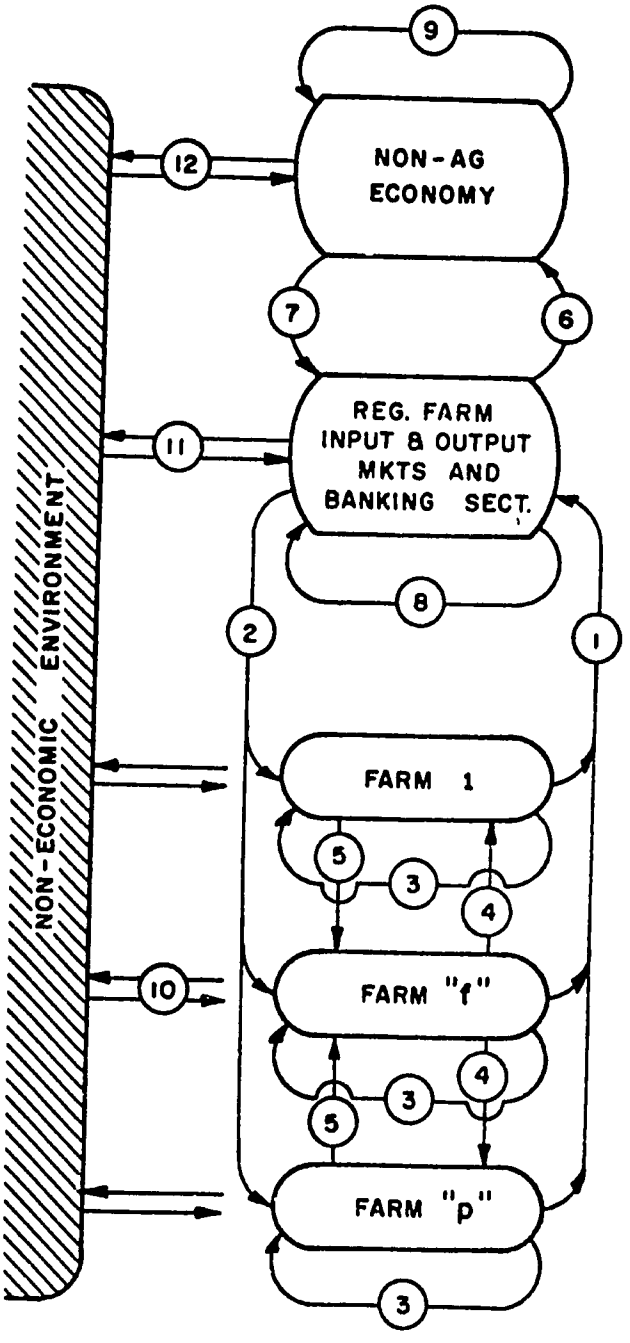

Figure 1. The farm as part of a complex system.

plans, not because he is irrational, but because he is (and knows he is) seldom prescient; he is cautious in adapting to a changing environment because tradition and experience suggest that caution is often a wise tactic in the game of economic survival; he responds to feedback from the market and the behavior of other agents because the task of estimating competitors' behaviors far exceeds the capacity of any individual's computational ability, even as it far exceeds the capacity of the largest and most sophisticated economic modeling center.

This view of "adaptive man" has served as the basis for the application of recursive programming models to economic development. Although the time available permits us to describe these models in the most general terms, we should note that, in addition to incorporating some of the essential features of adaptation just described, recursive programming models can incorporate as detailed a representation of technology and market structure as seems strategic for the problem at hand and compatible with the model building budget.

III

The farm sector in most underdeveloped countries is a decentralized decision-making system made up of numerous more or less independent farms. Each farmer must act on decisions, made usually in a disequilibrium situation, based on limited information about markets and in response to constraints or incentives imposed by government policies. The structure of a given farmer's environment, which consists of all other farms, markets, political organizations and nautre, is neither controlled nor well understood by him. He must adapt by responding to various variables, such as prices, revenues, quotas, and the past behavior of his neighbors which are exogenous from his point of view. His rules of adaptation link his current efforts at decision-making to his past experience and to the past behavior of his neighbors both because he may initate them and because their past actions do in the aggregate have an impact on the current market situation. The fundamental concepts which must therefore be taken into account in any theory intended to explain actual events are decision and feedback.

A breakdown of the individual farm's environment and feedback linkages is illustrated in Figure 1. The feedback loops connecting a given farmer's decisions in the present period to his experience (loop 3) and his "environment" (loops 1,2, 4–12) are indicated. Loops 1 and 2 show the indirect feedback that comes through the market, something that affects financial feasibilities, profit, and commercial consumption goals. Loops 4 and 5 show interagent linkages that exist because of imitation and direct exchanges of goods and services between neighbors. Loops 6 and 7 indirectly connect each farm to the nonfarm economy. Loop (10) indicates an environmental dependence that arises because farms are strongly influenced by weather and because they affect their physical surroundings through water pollution, soil depletion, and salination.

For operational purposes individual enterprises are of course not modelled. Instead representative farm aggregates, homogeneous regions and perhaps even entire industrial sectors are treated as economic units. But the way these aggregate units are modelled reflects the strategic realities of the macroeconomic situation.

IV

Recursive programming models can be based on target planning, cautious optimizing, utility maximizing, and satisficing. It is easy to show that target planning, cautious optimizing, and satisficing can all be regarded as behavior in which flat topped or satiable utility functions are maximized. Consequently we can speak of any of these as a *goal*. Goal fulfillment is then to be maximized. Most behavioral scientists regard behavior as determined by many different goals and these are arranged according to some (perhaps temporary) hierarchy or priority order. A first goal dominates comparison of alternatives until a satisfactory solution is obtained according to it; then a less important goal is maximized over the remaining alternatives and so on until a single, unique choice is reached and no more "room" for considering future goals is left.

Sequential attention to goals is of considerable use in understanding microeconomic behavior. It explains, for example, why people in one stage of development might behave very much differently than individuals in other stages of development. It also explains why many of the considerations

that dominate rich peoples' choices often seem trivial to poor people, or why when survival considerations dominate, a profit goal may be unimportant. Environmental conditions may bring about a current situation in which the past decision is no longer feasible or the aspiration level of some more important goal can no longer be attained. Under these conditions the more important goals must be reconsidered. Thus we see that a number of routes are possible in coming to a final choice.

The procedure as a whole is illustrated in Figure 2. One begins with past experience and current data. On the basis of these items the technological, resource, and financial constraints are determined. Any adaptive constraints, such as those implied by cautious behavior and current satisfying or aspiration levels, are also determined. Then the past decision is examined for feasibility. From the adaptive point of view current decisions are regarded as departures from past actions. If the past action is not feasible then a search for feasible alternatives must ensue. If none are found goals must be modified or the environment "negotiated". This means that the decision maker is modelled as getting help from outside. If the past solution is feasible it must be checked to see which, if any, of the high order goals are satisficed. Let us suppose goods 1, . . . , i are maximized. Then the next goal i + 1 is maximized. If there is no further

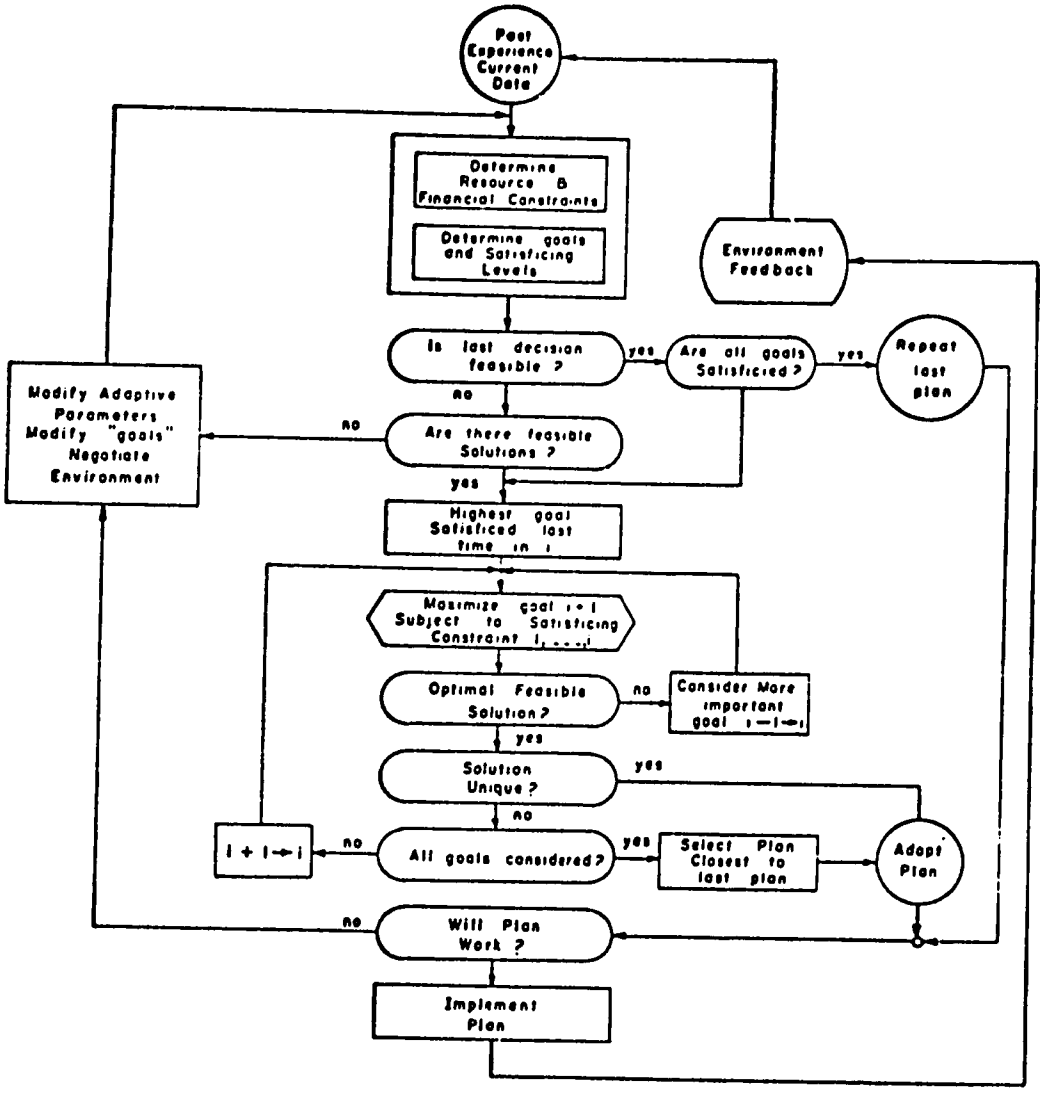

Figure 2. Recursive priority programs.

room for choice the procedure ends, and the plan is implemented. If the solution to the last maximizing problem is not unique then the next goal is maximized and the process continues step by step until there is no further room for choice, or until all the goals have been considered. If all goals have been considered and there is still room for choice we invoke the principle of "conservative selection". This asserts that among the solutions that satisfy all the goals the one closest to the past decision is selected.

Several important features of this model stand out. First, as long as a given number of high order goals are satisfied *their priority order has no affect on the solution.* Second, satisfied goals do not enter utility comparisons *but act as constraints on choice according to less important goals.* Peasant farmers probably do not think about their decision procedures in exactly this way. Certainly they would not articulate them using these terms. Nonetheless, we believe this general characterization is much more realistic than standard economic theory and it does approximate with some accuracy practice in the field and factory.

V

Standard economics presents a somewhat schizophrenic view of the world. On the one hand, it views economic behavior as being (1) consistent with complete and fixed preferences, (2) in equilibrium so that conditions of supply and demand are balanced, and (3) efficient, so that no agent can improve his lot without diminishing that of another. This is the standard economist's "positive" view. People, however, are often inconsistent, the economy appears frequently, if not always, to be more or less in disequilibrium, and improving conditions for some at the expense of worsening conditions for others is a commonplace occurrence: economic competition produces losers as well as winners. Consequently, the noeclassical theory can at best be an approximation of reality.

But, it can also provide an objective for policy. According to the orthodox view if the three conditions described by the theory do not exist, then they can be brought about by policies that remove "imperfections" in the system or that neutralize their effects. This is the other view of orthodox economics. It is the "normative view": reality does not conform to the theory; but can be made to. Theory provides a norm against which performance and hence policy can be tested.

The methodology presented here offers a departure from either of these positions. It begins with the proposition that economic development involves changing values, adjustment out of equilibrium, and a counterpoint of growth and decay that causes improving fortunes for some and declining fortunes for others. It continues with the proposition that the model builder's first objective is to develop an operational, mathematical representation of development that incorporates essential features of the process *as it unfolds.* This formal representation must be capable of incorporating strategic details of technology, decision-making, and environment relevant for the time and place under investigation. Also it must, insofar as possible, draw on and be consistent with direct observation of the process itself. It must be operational–not in Samuelson's sense of being capable of refutation in an "ideal' experiment–but in the sense that it can be approximated by a specific mathematical structure, estimated with real data, and simulated on the computer.

Having accomplished this objective the model builder must, as a next objective, validate his representation of the development process. Because his model is "realistic" in its constituent components, the model builder, in pursuing this objective, is looking for evidence that his model is mistaken in its representation of reality. Such evidence can then be used, not as a basis for rejecting the entire ediface, but as a guide to changing the model so that its approximation of reality is improved.

Once satisfied that the model "works" and that it approximates reality with useful accuracy, the model builder is ready to consider applications. Applications involve making conditional projections, comparative dynamic analyses and comparative static analyses.

Projections are conditional on estimated exogenous variables which are not "explained" by the model but on which their behavior depends. This is the Achilles heel of econometric analysis of any kind: no matter how good the model of a given part of the

process, if estimates of exogenous variables are "off" then the model's projections must also be "off". Nonetheless, by running the model for alternative "histories" of the exogenous variables, the development process may be better understood and future possibilities anticipated. Better understanding of the way a part of the real system works in response to changes in the rest of the world—the environment—is of great use in and of itself for policy analysis—not to mention the pursuits of idle curiosity. Also, by studying the model behavior for alternative histories of policy control variables, insight into likely responses of the real system over time can be anticipated. Such exercises might go a long way toward providing an early warning of impending problems that might otherwise be overlooked. One such problem is the generation of massive unemployment in the transition from traditional to modern technology.

In a third type of application, one can "stop the process'—as represented by the model—for a given period and ask, how would behavior change (or how would it have changed) in this given period if certain technological, behavior change (or how would it have changed) in this given period if certain technological, behavioral, economic, or policy parameters varied? This is an exercise in comparative statics. However, its interpretation is somewhat different than in its standard use. There we ask, how do equilibria change with changes in the parameters? Assuming convergence of the underlying dynamic process, this answer is relevant to the analysis of "long run" adjustments. Here, however, we answer questions about the long run by running the model dynamically for many periods, i.e., by using comparative dynamics. Comparative statics in our application will indicate only short run changes likely to occur within a given period. A succession of such analyses generates shifting supply and demand curves and other comparative static functions derivable from the model structure.

If an adaptive model of disequilibrium behavior such as ours were to converge to the conditions of the pure competition of standard economics, this would, of course, constitute a kind of validation of the use of static analysis, even for the study of development. Because of this possibility—which some modelling studies have realized—we do not oppose the use of standard economic analysis. Indeed, we espouse an eclectic view toward competing methodologies and believe that most, given limitations of time, scope, and cost, have something to offer.

Nonetheless, we believe that models of man in his imperfections, as he suboptimizes and as he adapts his behavior out of equilibrium to "external circumstances", should in general be emphasized. These will improve our understanding of the development process and provide a workable tool for generating policy information that is credible because it is based on realistic assumptions.

Moreover, it is possible—if not evident—that a central feature of economic existence is the disruption of equilibria and the movement away from old positions toward new equilibria, that eventually, in their turn, give way to still newer ones. If this is true, then the central problem for the model builder is not to provide a tool for steering the economy toward the safe harbor of efficient equilibrium of perfect competition. Rather, it is to provide instruments for steering the economy through massive economic disruption with a socially acceptable degree of individual harm, for, out of equilibrium, some are losers in the game of life and the best that can be achieved is a just compensation for damage that is irreparable.

For the latter reason (if this view of the long run is correct) economic development inevitably involves conflict among the parties involved. Consequently, the resolution of policy can only occur through debate or persuasion or, in the absence of demorcratic process, through coercion. The model builder's role in this circumstance, is to replace reality with mathematical, computer models. These, used as a laboratory for social experimentation, enable "outcomes' or "scenarios" to be generated without suffering their consequences, thus permitting society a wider range of choice between possible future histories.

How society will choose among the possibilities is a question that model builder's may never be able to answer. For the sake of our human freedom, let us hope that we cannot. We *can* add to the understanding, however, and in so doing can provide a sound basis for the evolution of reasonable and workable solutions to society's problems as they emerge.

ECONOMIC DEVELOPMENT AND PLANNING IN VIRGINIA, 1950–2000

BY

WILLIAM J. SEROW*

I. INTRODUCTION

The purpose of this paper is to review trends in economic development in the Commonwealth of Virginia for the past few decades, and to assess some of the implications of these trends for the future. The pattern of economic development in the state is essentially a pattern of continuing urban expansion. In 1950, less than half of Virginia's population–47 percent resided in urban areas. Twenty years later, this proportion had risen to 63 percent. By way of contrast, comparable data for the entire nation showed percentages of 64 and 73, respectively.

Changing patterns of residence are indicative of many other changes which have occurred in the state since 1950. The following section of this paper reviews these changes in terms of social indicators such as education, employment, and income. Analysis of such variables in effect describes the level o. economic development and changes in th's level in recent years.

The third, and concluding section deals with the planning aspect of the paper. In this section, analysis is confined to the future of Virginia. Again, the treatment focuses on the question of urbanization in the state, and on some of the potential costs and benefits of this urban development.

II. ECONOMIC DEVELOPMENT IN VIRGINIA, 1950-1970

Between 1950 and 1970 there were significant changes in the socioeconomic status of Virginian residents. This section reviews trends for the State in the areas of educational achievement, employment, income, and labor force composition.

A. Educational Achievement

The median number of school years completed rose 3.2 years between 1950 and 1970.[1] In 1950 median years of school was 8.5, slightly more than a grade shcool education. The median increased steadily, and by 1970 it was 11.7 years, almost a complete high school education. (See Table 1.)

Between 1950 and 1970 there was a significant decline in the number of persons having only an eighth grade education. In each decade the share of the population with no more than an eighth grade education declined about 10 percent, but in absolute numbers the greatest decline (15.6 percent) occurred between 1960 and 1970.

The number of persons in Virginia who received no more than a high school diploma increased by 135 percent between 1950 and 1970. The greatest increase (65 percent) occurred between 1950 and 1960. In 1960, 20.7 percent of the population had earned just a high school diploma and, by 1970, 25.2 percent had done so.

The most spectacular increase occurred among those who completed at least four years of college. Only 6.5 percent of the population in 1950 had earned at least a college degree compared to 8.4 percent in 1960 and 12.3 percent in 1970. In absolute numbers, the number of persons who earned at least an undergraduate degree increased by 166.2 percent between 1950 and 1970.

B. Labor Force

The socioeconomic changes which occurred in Virginia between 1950 and 1970 are reflected in the changing composition of Virginia's labor force. These changes may be viewed in three ways: the demographic composition of the labor force, the occupational composition, and the industrial composition.

1. Demographic Composition. In 1950 there were 1,305,611 persons in Virginia's labor force. The number increased to 1,532,599 by 1960. A greater increase

[1] The median is that point in the exact middle of the distribution.

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Table 1. Number of School Completed, Persons Aged 25 and Over, Virginia: 1950, 1960, and 1970.

Years of School Completed	1950 Number	1950 Percent of Total	1960 Number	1960 Percent of Total	1970 Number	1970 Percent of Total	Percent Change 1950–60	Percent Change 1960–70	Percent Change 1950–70
0	59,265	3.4	55,356	2.7	39,708	1.6	-6.6	-28.3	-33.0
1–4	256,105	14.4	218,164	10.5	147,707	6.0	-14.8	-32.3	-42.3
5–6	257,715	14.8	254,124	12.2	203,066	8.3	-1.4	-20.1	-21.2
7	231,070	13.2	228,146	11.0	212,938	8.7	-1.3	-6.7	-7.9
8	152,770	8.8	178,316	8.6	184,978	7.6	16.7	3.7	21.0
Total Grade School	897,660	51.5	878,750	42.3	748,689	30.6	-2.4	-15.6	-17.6
9-11	281,225	16.1	358,614	17.2	488,962	20.0	27.5	36.4	73.6
12	261,855	15.0	432,107	20.7	616,942	25.2	65.0	42.4	135.6
Total High School	543,080	31.1	790,721	37.9	1.105,904	45.2	45.6	39.9	103.6
13–15	132,855	7.6	183,428	8.8	250,838	10.3	38.1	36.8	88.8
16+	113,070	6.5	174,904	8.4	300,943	12.3	54.7	72.1	166.2
Total Post-Secondary	245,925	14.1	358,332	17.2	551,781	22.6	45.7	54.0	124.4
Total	1,745,930	100.0	2,083,159	100.0	2,446,082	100.0	16.5	18.2	37.7
medians	8.5		9.9		11.7				

occurred by 1970, bringing the total Virginia labor force to 1,956,894. and increase of 49.9 percent over 1950.

The portion of the population in the military increased slightly between 1950 and 1970. Of the 1950 population aged 14 and over 4.5 percent (108,935 persons) was in the military, compared to 4.8 percent (133,082) of the 1960 population and 5.1 percent (175,718) of the 1970 population. Similarly, the civilian labor force increased from 49.8 percent (1,196,676 persons) in 1950 to 50.8 percent (1,399,517) in 1960 and 52.1 percent (1,781,176) in 1970. In 1950 the civilian labor force was 72.7 percent male and 27.3 percent female, but by 1960 the female share increased to 33.7 percent and by 1970 to 39.4 percent.

The civilian labor force participation rate (that is, the number of persons in the civilian labor force, divided by the total population aged 14 and over) increased gradually from 49.8 percent in 1950 to 50.8 percent in 1960 and 52.1 percent in 1970.

In 1950 the overall rate of participation was higher for nonwhites (53.9 percent) than whites (48.6 percent).[2] The nonwhite male rate (74.0 perwas higher than the white male rate (71.3 percent); the nonwhite female rate (33.8 percent) was higher than the white female rate (25.6 percent). Though the 1960 nonwhite labor force participation rate was still higher than the white rate, the white male rate (68.5 percent) surpassed the nonwhite male rate (66.9 percent) while the white female (32.6 percent) lagged behind the nonwhite female rate (39.0 percent). By 1970 the overall white (52.2 percent) was higher than the nonwhite rate (51.6 percent). The difference in the male rates had widened; the white male rate was 65.5 percent, and the nonwhite male rate was 58.0 percent. The difference between the female rates had narrowed; the white female rate was 39.4 percent, and the nonwhite female rate was 40.3 percent.

Though the male labor force participation rate was consistently higher than the female rate between 1950 and 1970, there was a significant decrease in the span between the two. The rate for males was much higher than the rate for females in 1950 (71.8 percent for males and 27.4 percent for females), buy by 1960 the male rate had declined slightly to 68.2 percent while the rate for females had risen considerably to 33.9 percent. By 1970 the male rate of participation had dropped to 63.7 percent while the female rate had risen to 40.1 percent.

The decrease in participation among males could be the result of the increasing incidence of Armed Forces service (8.6 percent of male Virginians in the *entire* labor force were military in 1950, compared with

Table 2. Demographic Characteristics of Virginia's Labor Force: 1950, 1960, and 1970.

TABLE 2. DEMOGRAPHIC CHARACTERISTICS OF VIRGINIA'S LABOR FORCE: 1950, 1960, and 1970

Year	Total		White Male		White Female		Nonwhite Male		Nonwhite Female	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1950										
Total Population 14+	2,404,426	100.0	954,534	39.7	937,160	40.0	256,265	10.7	256,467	10.7
Number in Labor Force	1,305,611	100.0	77,349	59.5	244,168	18.7	196,945	15.1	87,149	6.7
Labor Force Participation Rate		49.8		71.3		25.6		74.0		33.8
Number in Military	108,935	100.0	97,195	89.2	4,063	3.7	7,436	6.8	241	0.2
Civilian Labor Force	1,196,676	100.0	680,154	56.8	240,105	20.1	189,509	15.8	86,908	7.3
Employed Civilian	1,150,164	100.0	659,781	57.4	232,752	20.2	177,481	10.2	80,150	7.0
Unemployment Rate		3.9		3.0		3.1		6.3		7.8
1960										
Total Population 14+	2,753,069	100.0	1,098,198	39.9	1,121,750	40.8	262,322	9.5	270,799	9.8
Number in Labor Force	1,532,599	100.0	874,244	57.0	367,985	24.0	184,641	12.1	105,749	6.9
Labor Force Participation Rate		50.8		68.5		32.6		66.9		39.0
Number in Military	133,082	100.0	121,635	91.4	2,124	2.0	9,169	8.1	154	0.1
Civilian Labor Force	1,399,517	100.0	752,589	53.8	365,861	26.1	175,472	12.5	105,595	7.5
Employed Civilian	1,340,800	100.0	726,226	54.2	353,516	26.4	163,324	12.2	97,734	7.3
Unemployment Rate		4.2		3.5		3.4		6.9		7.4
1970										
Total Population 14+	3,418,599	100.0	1,379,460	40.4	1,431,984	41.9	291,658	8.5	315,497	9.2
Number in Labor Force	1,956,894	100.0	1,058,161	54.1	567,235	29.0	193,815	10.0	137,683	7.0
Labor Force Participation Rate		52.1		65.5		39.4		58.0		40.3
Number in Military	175,718	100.0	154,256	87.6	3,298	1.9	17,727	10.1	437	0.2
Civilian Labor Forfe	1,781,176	100.0	903,905	50.8	563,937	31.7	176,088	9.9	137,246	7.7
Employed Civilian	1,727,111	100.0	885,555	51.3	545,247	31.6	169,009	9.8	127,300	7.4
Unemployment Rate		3.0		2.0		3.3		4.0		7.2

	1950		1960		1970		Change
	Number	Percent	Number	Percent	Number	Percent	1950–1970
Total Population 14+	2,404,426	100.0	2,753,069	100.0	3,418,599	100.0	42.2
Number in Labor Force	1,305,611	54.3	1,532,599	55.7	1,956,894	57.2	49.9
Number in Military	108,935	4.5	133,082	4.8	175,718	5.1	61.3
Civilian Labor Force	1,196,676	49.8	1,399,517	50.8	1,781,176	52.1	48.8
Employed Civilian	1,150,164	47.8	1,340,800	48.7	1,727,111	50.5	50.2

13.7 percent in 1970) and increasing attendance at post-secondary educational institutions (13.8 percent of all Virginians aged 18–24 were enrolled in school in 1950 compared with 26.2 percent in 1970).[3]

Labor force participation among females was higher at all ages in 1970 than 1950, particularly for women over age 25 and most especially for women between the ages of 45 and 65. This suggests that married women tended to return to the labor force at a much greater rate in 1970 than 1950. (See Table 2).

The civilian unemployment rate rose from 3.9 percent in 1950 to 4.2 percent in 1960 but dropped to 3 percent by 1970. Between 1950 and 1970 the male unemployment rate was consistently lower than the female rate (3.7 percent and 4.3 percent respectively in 1950, 4.1 percent and 4.3 percent in 1960, and 2.4 percent and 4.1 percent in 1970), and the white rate remained markedly lower than the nonwhite rate (3.0 percent and 6.8 percent in 1950, 3.5 percent and 7.1 percent in 1960, and 2.5 percent and 5.4 percent in 1970). However, the urban rate (4.7 percent), which was notably higher than the rural rate (2.7 percent) in 1950, decreased by 1960 while the rural rate increased. In 1960 the unemployment rate in urban areas was 3.8 percent and in rural areas it was 4.8 percent. Both urban and rural rates decreased by 1970, though the urban rate (2.9 percent) was still lower than the rural rate (3.3 percent).

2. *Occupational Composition.* The most remarkable change in the occupational composition of Virginia's labor force between 1950 and 1970 was the widespread shift from agriculture to other areas of the economy. In 1950 14.3 percent of the state labor force (164,673 persons) was in agriculture (farmers, farm managers, farm foreman, and farm laborers). By 1960 only 7.2 percent (96,000) was employed in agriculture. In 1970 agricultural employment accounted for a mere 2.5 percent of Virginia's labor force. Only 33,297 persons were employed in agriculture.

The greatest increase in employment between 1950 and 1970 was in the white collar segment of the labor force. In 1950 33.5 percent of employment (385,065 persons) was in white collar occupations (professional, managerial, clerical, sales). By 1960 these workers accounted for 40.1 percent of the labor force (537,978 persons), an increase over 1950 of 39.7 percent. White collar occupations continued to increase in number and in 1970 806,837 persons (46.7 percent of the entire labor force) were white collar workers. The rate of increase over the twenty-year period for all white collar occupations was 109.5 percent: among professionals, it was 177.4 percent; among managers, 58.1 percent; among sales personnel, 49.3 percent; and among clerical employees, 129.4 percent. Growth in the latter area was concomitant with the pronounced upsurge in labor force participation by women.

There was a significant increase in the number of blue collar workers in Virginia's labor force between 1950 and 1970, although the share of employment in this sector decreased because of the relatively greater increase in white collar employment. In 1950, 46.9 percent of the labor force (539,271 persons) was in blue collar occupations (operators, craftsmen, service workers). By 1960 these workers numbered 600,121, an increase of 11.3 percent over 1950, but they accounted for only 44.4 percent of the entire labor force. Blue collar workers numbered 746,428 in 1970, an increase of 24.4 percent over 1960, but the share of this group in the total labor force declined slightly to 43.2 percent.

Within the blue collar employment sector, the number of craftsmen and service workers increased substantially between 1950 and 1970. The number of operators increased moderately while the number of nonfarm laborers declined.

The number of persons employed in the private household sector increased 14.7 percent from 43,999 in 1950 to 59,461 in 1960. In both years this group accounted for a small share of Virginia's labor force (3.8 percent in 1950 and 3.4 percent in 1960).

[3] Another factor might well be the consistently increasing incidence of retirement at age 65 and even at younger ages. Seymour Wolfbein's *Work in American Society* (Glenview, Ill.: Scott, Foresman and Company, 1971) shows that the retirement rate for men aged 65 had nearly tripled between 1950 and 1960;. . ."The evidence for the 1960's indicates that this had continued to be the case in more recent years with growing indications, however, that more and more men are beginning to retire at even earlier ages than 65. . ." (p. 1970).

Table 3. Occupational Distribution of Virginia's Employed Labor Force: 1950, 1960, and 1970.

	1950		1960		1970	
	Number	Percent	Number	Percent	Number	Percent
Professional	94,690	8.2	153,729	11.5	262,677	15.2
Managerial	89,230	7.8	106,297	7.9	141,070	8.2
Clerical	128,273	11.2	188,234	14.0	294,256	17.0
Sales	72,872	6.3	93,967	7.0	108,834	6.3
Craftsmen	152,294	13.2	177,549	13.2	231,612	13.4
Operatives	223,106	19.4	240,899	18.0	278,034	16.1
Nonfarm Laborers	88,125	7.7	76,519	5.7	77,428	4.5
Farmers	102,057	8.9	58,945	4.4	23,399	1.4
Farm Laborers	62,616	5.4	36,275	2.7	19,747	1.1
Service Workers	75,746	6.6	101,526	7.6	159,354	9.2
Private Household Workers	43,999	3.8	50,697	3.4	35,937	2.1
Not Reported	17,156	1.5	56,163	4.2	94,784	5.5
Total	1,150,164	100.0	1,340,800	100.0	1,727,132	100.0

Between 1960 and 1970 the number of private household workers declined by 28.8 percent to slightly less than 36,000 persons, representing only 2.1 percent of the state's labor force. Over the two-decade period, employment in private households diminished by 18.3 percent or 8,062 persons. Data summarizing changes in the occupational distribution of Virginia' work force are given in Table 3.

3. *Industrial Composition.* The shift in the industrial composition of Virginia's labor force parallels the occupational data. Occupational data tell what members of the labor force do; industrial data describe the principal good or service produced by employers of the labor force. Data summarizing the industrial composition of Virginia's labor force are given in Table 4.

In the years 1950, 1960, and 1970, the largest single sector was manufacturing. This sector grew from 236,704 employees in 1950 (20.58 percent of employment). to 364,010 employees in 1970 (21.23 percent of employment). The overall increase in this sector was 53.7 percent from 1950 to 1970. Employment in durable goods manufacturing grew faster than employment in nondurable goods manufacturing. In 1950, the latter accounted for 61.7 percent of all employment in manufacturing. By 1970, it had fallen to 55.7 percent.

Over the twenty-year period, the fastest growing sector was professional and related services. In 1950, employment in this sector was 89,403 or 7.77 percent of the total. By 1970, it had risen to 269,618 or 15.73 percent of the total. Employment in this sector increased by 201.53 percent from 1950 to 1970. Other sectors which grew at a rate faster than the overall level (49.04 percent in the twenty-year period) include: finance, insurance, and real estate (138.49 percent); business and repair services (103.24 percent); public administration (89.01 percent); wholesale trade (71.44 percent); and retail trade (51.22 percent).

Industries which experienced growth, but at a rate lower than the state total include entertainment and recreation services (46.42 percent); construction (42.33 percent); and transportation, communication, and other public utilities (19.58 percent). Finally, employment diminished in three sectors: personal services (1.34 percent); mining (44.91 percent); and agriculture, forestry, and fisheries (70.41 percent).

C. Income

Significant changes occurred in the income level of Virginians between 1950 and 1970. In general, income increased sharply but at a slightly lower pace between 1960 and 1970. In 1950 the median income per family was $2,644, and by 1960 it had increased by 87.7 percent to $4,964. An additional increase of 82.3 percent between 1960 and 1970 created a median income of $9,049 in 1969. It should be realized that income data are in current dollars—that is, not adjusted for the diminution of purchasing power (inflation) that has been experienced in recent years. If we convert family income to constant (1967) dollars, we would find that median family income in 1950 would have been $3,704, and that in 1970 it would be $8,244. Thus, in terms of the real purchasing power of family income, the change from

Table 4. Industrial Composition of Virginia's Employed Work Force: 1950, 1960, and 1970

Industrial Cateogry	1950 Number	1950 Percent	1960 Number	1960 Percent	1970 Number	1970 Percent	Percent Change 1950–1970
1. Agriculture, forestry, and fisheries	174.078	15.14	104,873	7.81	51,508	3.01	–70.41
2. Mining	28,985	2.52	19,277	1.44	15,969	0.93	–44.91
3. Construction	82,592	7.18	91,134	6.80	117,555	6.86	42.33
4. Durable goods manufacturing	90,664	7.88	124,155	9.26	161,150	9.40	77.74
5. Nondurable goods manufacturing	146,040	12.70	175,780	13.11	202,860	11.83	38.91
6. Transportation, communications, other public utilities	91,118	7.92	93,172	6.95	109,208	6.37	19.85
7. Wholesales trade	31,613	2.75	37,411	2.79	54,196	3.16	71.44
8. Retail trade	156,007	13.56	191,844	14.31	235,906	13.76	51.22
9. Finance, insurance, and real estate	30,084	2.62	47,123	3.51	71,748	4.19	138.49
10. Business and repair service	20,620	1.79	28,069	2.09	41,908	2.44	103.24
11. Personal services	84,969	7.39	95,632	7.13	83,830	4.89	–1.34
12. Entertainment and recreation services	6,913	0.60	7.705	0.57	10.122	0.59	46.42
13. Professional and related services	89,403	7.77	150,640	11.24	269,618	15,73	201.58
14. Public administration	99,246	8.63	130,569	9.74	187,580	10.94	89.01
Not reported	17,832	1.55	43,616	3.25	101,092	5.90	466.90
Total	1,150,164	100.00	1,340,800	100.00	1,714,250	100.00	49.04

**Persons aged 16 years and over. A total of 12,822 persons aged 14–15 years are included in the occupational data of Table 3 but excluded here. Some 1,061 of these persons are employed in agriculture; the remaining 11,821 in other industries. Thus, of total employment in Virginia in 1970 of 1,727,132, some 52,569 or 3.04 percent are employed in the agriculture sector.*

Table 5. Distribution of Income of Virginia Families: 1950, 1960, and 1970

Income Category	1950 Number	1950 Percent	1960 Number	1960 Percent	1970 Number	1970 Percent	Percent Change 1950–60	Percent Change 1960–70	Percent Change 1950–70
Less than $1,000	137,500	18.5	80,229	8.4	32,818	2.8	-41.6	-59.1	-76.1
$1,000–$1,999	137,930	18.6	85,883	9.0	43,531	3.7	-37.7	-49.3	-68.4
$2,000–$2,999	149,545	20.1	100.017	10.5	51.495	4.4	-33.1	-48.5	-65.5
$3,000–$3,999	119,115	16.0	106,901	11.2	61,252	5.3	-10.2	-42.7	-48.5
$4,000–$4,999	70,830	9.5	108,185	11.3	67,059	5.8	52.7	-38.0	-5.3
$5,000–$5,999	47,225	6.4	102,826	10.8	76,385	6.6	117.7	-25.7	61.7
$6,000–$6,999	28,730	3.9	84,835	8.9	79,682	6.9	195.2	-6.0	177.3
$7,000–$9,999	33,880	4.6	159,398	16.7	241,612	20.8	370.4	51.5	613.1
$10,000+	18,645	2.5	126,446	13.2	508,422	43.7	578.1	302.0	2,626.8
Total	743,400	100.0	954,720	100.0	1,162,256	100.0			
Median	$2,644		$4,964		$9,049		87.7	82.2	242.2

1950 to 1970 was 122.6 percent. (See Table 5.)

Nearly one-fifth of all Virginian families received less than $1,000 income in 1950. By 1960 this share of families dropped to 8.9 percent, and in 1969 only 2.8 percent had an income less than $1,000. Furthermore, in 1950 only 2.5 percent of Virginian families had income of $10,000 or more. The number grew to 13.2 percent by 1960, and in 1969 a spectacular 43.7 percent of Virginia families had incomes of at least $10,000.

In 1970 for the first time, data which show the incidence of poverty in the state were made available. "Poverty" is defined as a level of income below the guidelines established by the Social Security Administration. The poverty level varies according to household size, age and sex of head, and farm-nonfarm residence (see Table 6). The value of the poverty level ranges from $6,665 for a nonfarm family of seven with a male head to $1,489 for a single female aged 65 and over living on a farm.

In Virginia 12.3 percent of all families received income in 1969 which placed them below the poverty guidelines. This amounted to 143,005 families or 575,330 persons. Among these families, mean income was only $2,025. Additionally, 115,205 single persons, living alone, received income below the poverty level; these 115,285 represent 36.9 percent of all individuals living by themselves in one person households. All told, some 690,615 Virginians were in a poverty status based on 1969 income; this is 14.9 percent of the State's enumerated 4,648,494 persons.

The incidence of poverty is strongly influenced by the race, age, and sex of the family head and by the place of residence. In 1970 there were more poor families with a white head (88,065) than a nonwhite head (54,940); however, only 9.0 percent of all families with a white head had incomes below the poverty level compared to 29.2 percent of families with a nonwhite head. Only 10.6 percent of families with head aged under 65 were termed poor compared to 25.7 percent of families with head aged 65 and over; only 11.6 percent of all families, but 24.2 percent of poor families, were headed by a person aged 65 and over. Of the 47,505 families (33.2 percent of all families) headed by a female, some 36.8 percent were below the poverty level compared to 9.2 percent of families with a male head. Though only 37.2 percent of all families in the State lived in rural areas, rural families comprised 53.8 percent (76,916) of all poor families. Only 9.1 percent of urban families had incomes below the poverty level compared to 17.8 percent of rural families.

D. Summary

In summary, then, recent census data have shed considerably light upon the changing status of Virginians. In the twenty years between 1950 and 1970, the median number of school years attained by the average adult (25 years old or over) rose from slightly more than an elementary school education (8.5 years) to near completion of high school (11.7 years). In 1950, only 28.4 percent of all Virginians (25+) had completed high school; by 1970, this increased to 47.8 percent.

The median income of Virginia families rose by 242.2 percent in the two decade period from an initial level of $2,644 to a terminal level of $9,049. Only 2.5 percent of Virginia's families had income in excess of $10,000 in 1050. compared with 43.7 percent in 1970.

Table 6. Poverty Income criteria for families, by age and sex of head, farm or nonfarm residence, and number of children under age 18

Family Size	None	1	2	3	4	5	6 or more
male Head—Nonfarm							
1. Under 65 years old	$1,975	---	---	---	---	---	---
65 years old and over	1,774	---	---	---	---	---	---
2. Under 65 years old	2,469	$2,766	---	---	---	---	---
65 years old and over	2,216	2,766	---	---	---	---	---
3.	2,875	2,968	$3,137	---	---	---	---
4.	3,792	3,847	3,715	$3,902	---	---	---
5.	4,574	4,630	4,481	4,368	$4,462	---	---
6.	5,247	5,265	5,153	5,041	4,891	$4,967	---
7. or more	6,609	6,665	6,535	6,422	6,274	6,049	$5,994
Male Head—Farm							
1. Under 65 years old	$1,679	---	---	---	---	---	---
65 years old and over	1,508	---	---	---	---	---	---
2. Under 65 years old	2,099	$2,351	---	---	---	---	---
65 years old and over	1,884	2,351	---	---	---	---	---
3.	2,444	2,523	$2,666	---	---	---	---
4.	3,222	3,270	3,158	$3,317	---	---	---
5.	3,888	3,936	3,809	3,713	$3,793	---	---
6.	4,460	4,475	4,4380	4,285	4,157	$4,222	---
7. or more	5,618	5,665	5,555	5,459	5,333	5,142	$5,095
Female Head—Nonfarm							
1. Under 65 years old	$1,826	---	---	---	---	---	---
65 years old and over	1,752	---	---	---	---	---	---
2. Under 65 years old	2,282	$2,491	---	---	---	---	---
65 years old and over	2,190	2,491	---	---	---	---	---
3.	2,781	2,651	$2,931	---	---	---	---
4.	3,641	3,771	3,753	$3,715	---	---	---
5.	4,368	4,500	4,481	4,444	$4,294	---	---
6.	5,096	5,191	5,153	5,115	4,948	$4,798	---
7. or more	6,403	6,497	6,478	6,422	6,255	6,124	$5,825
Female Head—Farm							
1. Under 65 years old	$1,552	---	---	---	---	---	---
65 years old and over	1,489	---	---	---	---	---	---
2. Under 65 years old	1,940	$2,117	---	---	---	---	---
65 years old and over	1,862	2,117	---	---	---	---	---
3.	2,364	2,253	$2,491	---	---	---	---
4.	3,095	3,205	3,190	$3,158	---	---	---
5.	3,713	3,825	3,809	3,777	$3,650	---	---
6.	4,332	4,412	4,380	4,348	4,206	$4,078	---
7. or more	5,443	5,522	5,506	5,459	5,317	5,205	$4,951

Source: Census, Public Use Samples of Basic Records From the 1970 Census: Description and Technical Documentation (Government Printing Office, 1972) p. 122.

Employment in Virginia increased by 49.0 percent between 1950 and 1970, from 1.15 million in 1950 to 1.71 million in 1970. The demographic, occupational, and industrial composition of the state's labor force shifted dramatically over the period. Females became an increasingly important factor in the state's labor force. In 1950, 27.3 percent of the labor force was female–27.4 percent of all females over age 14 were in the labor force in that year, compared with 71.8 percent of all males. By 1970, the percentage of the labor force that was female had risen to 39.6 percent and the labor force participation rate among females had increased to 40.1 percent.

The occupational and industrial composition of the labor force showed a pronounced move out of the agricultural sector. In 1950, 14.3 percent of the labor force, 164,673 persons, was employed in agricultural occupations (farmers, farm managers, farm foremen, farm laborers); by 1970, this had decreased to 43,146 persons, or 2.5 percent of the employed labor force. Over the same period, the number of persons engaged in white collar occupations rose from 385,065, or 33.5 percent of the state's employed labor force in 1950 to 806,837 or 46.7 percent in 1970.

These shifts are also evident in the industrial composition of the state's labor force. The fastest growing industrial groups (in terms of total employment) between 1950 and 1970 were professional services; finance, insurance, and real estate; business services; and public administration. On the other hand, employment in agriculture, forestry, and fisheries declined by over 70 percent and employment in mining declined by nearly 50 percent from 1950 to 1970.

III. PLANNING FOR VIRGINIA

Population projections for the Commonwealth of Virginia and its component jurisdictions are prepared regularly by the Division of State Planning and Community Affairs. The Division's current projections suggest that Virginia's population will be about 6.6 million persons by the end of the present century, and increase of about 42 percent over the 1970 level. The projections also indicate that the pattern of growth will be substantially different in differing portions of the State. As can be seen from the data in Table 7, a great deal of overall growth is projected to occur in heavily urbanized areas. In 1970, the five largest urban areas in the state (Northern Virginia, Norfolk-Virginia Beach, Richmond, Newport News–Hampton, and Roanoke) accounted for 60 percent of the State's total population. The projections for the year 2000 suggest that this figure will increase to 64 percent. About 850,000 additional persons, or 43 percent of the total increase of 1.95 million persons in the State, are forecast as residing in the already heavily urbanized Northern Virginia and Tidwater areas. The projected increase of the population of the Fredericksburg, Richmond, and Peninsula areas indicates that so called Boswash megalopolis (a nearly unbroken urban area between these cities) will extend through Tidewater Virginia by the end of the century. Relatively high growth is also expected in smaller urban areas of the western portion of the state, from Culpeper southwest to Radford and Montgomery County.

The calculation of costs and benefits of this considerable change initially depends upon the point of view taken in the analysis. Essentially, there are two possible alternatives: that of the individual (private costs and benefits) and that of society (social costs and benefits). We cannot attempt to study costs and benefits from the point of view of any one individual or of any group of individuals because the values of costs and benefits are to some extent a matter of individual tastes and preferences. There is, however, a great deal that can be said about social costs and benefits.

Increased population brings with it increased demand for a variety of goods and services. Some of these may require extensive capital outlays–transportation, housing, education, water and sewage, and so on. Others may not require as much capital, but may require considerable expenditures for personnel costs. The extent to which additional revenues generated by urban growth will be sufficient to pay for the needed additional outlays will be dependent upon such factors as existing facilities and tax structure in the community.

A considerable amount of urban growth is shaped by policy makers at the federal, state, and local levels. Federal government actions have, for example, greatly affected Virginia in terms of substantially increased

Table 7. Projected Population Growth 1970-2000 for Virginia Planning Districts

Area	1970 Population	Percent of State Population, 1970	2000 Population	Percent of State Population, 2000	Annual Growth Rate 1970–2000 (Percent)	Percent Urban in 1970
1. Lenowisco PDC	84,816	1.82	96,000	1.45	0.41	13.2
2. Cumberland Plateau PDC	112,497	2.42	125,000	1.89	0.35	12.7
3. Mount Rogers PDC	159,412	3.43	181,600	2.75	0.44	26.5
4. New River Valley PDC	114,833	2.47	181,800	2.75	1.54	34.1
5. Fifth PDC	231,175	4.97	321,000	4.86	1.54	74.5
6. Central Shenandoah PDC	186,306	4.01	262,500	3.97	1.15	39.0
7. Lord Fairfax PDC	106,372	2.29	145,200	2.20	1.04	24.9
8. Northern Virginia PDC	921,276	19.81	1,586,400	24.01	1.83	88.1
9. Rappahannock-Rapidan PDC	72,222	1.55	105,100	1.59	1.26	17.8
10. Thomas Jefferson PDC	115,235	2.48	173,300	2.62	1.37	33.7
11. Central Virginia PDC	165,997	3.57	225,400	3.41	1.02	47.9
12. West Piedmont PDC	219,179	4.71	261,600	3.96	0.59	36.1
13. Southside PDC	82,563	1.77	87,200	1.32	0.18	16.5
14. Piedmont PDC	77,060	1.66	83,600	12.72	1.27	10.0
15. Richmond Regional PDC	547,542	11.77	840,200	12.72	1.44	78.4
16. RADCO PDC	77,425	1.66	135,700	2.05	1.89	22.9
17. Northern Neck PDC	37,011	0.80	41,800	0.63	0.41	00.0
18. Middle Peninsula PDC	47,069	1.02	64,400	0.97	1.01	5.5
19. Crater PDC	161,059	3.46	193,600	2.93	0.62	63.3
20. Southeastern Virginia PDC	769,371	16.54	952,800	14.42	0.72	89.4
21. Peninsula PDC	319.081	6.86	490,300	7.42	1.44	86.9
22. Accomack-Northampton PDC	43,446	0.93	51,500	0.78	0.57	00.0
Virginia	4,651,487	100.0	6,606,000	100.00	1.18	63.1

Source: Virginia Division of State Planning and Community Affairs, "Population Projections: Virginia Counties and Cities, 1980–2000" (March 1975).

employment in and around Washington, D. C., as well as changes in the station strength of the several military installations in the state.[4]

In addition to an analogous role in termes of the location of facilities, the state government also influences urban growth by drawing new industry to the various areas of the Commonwealth. A relatively sizeable new industry, such as the Volvo plant in Chesapeake may serve as a stimulus to growth and will create substantial costs and benefits. Local governments also affect urban development in variety of ways, including their own efforts to attract new industry, as well as zoning and related decisions that are made by one governmental body may strongly affect the future course of events in surrounding localities as well. Problems of this nature may be relatively more severe in Virginia, due to the separation of counties and cities which is unique to the Commonwealth. In brief, then, some portion of the costs and benefits associated with urban growth are a function of the decision making process which caused or abetted the growth in the first place. A recent commentary by Robert E. Merriam, Chairman of the Advisory Commission on Intergovernmental Relations, included a checklist of possible state actions to implement urban growth policies. These are appended without further comment.

II. State Action to Further Urban Growth Policy
- A. Influencing Industrial Location
  1. Enactment of State legislation authorizing establishment of State and regional industrial credit facilities as means of providing additional sources of credit for desired urban development.
  2. Enactment of State legislation to authorize preference under specified conditions in the award of public contracts.
  3. Establishment of policies for locating public buildings, activities, and facilities.
- B. Large-scale Urban and New Community Development
  1. Enactment of State legislation to provide for chartering of State and local land development agencies.
  2. State or regional acquisition of lands for future developmental purposes.
  3. Provision of State property tax deferral for new community development.
- C. Other Intergovernmental Measures for More Orderly Urban Development
  1. Strengthen local govenment
     - (a) Structure
       - (1) Facilitate county consolidation in rural areas.
       - (2) Authorization for metropolitan planning agencies.
       - (3) Multi-purpose planning and development agencies in non-metropolitan areas.
       - (4) Metropolitan functional authorities.
       - (5) Special county subordinate service districts.
       - (6) Authorization of optional forms of municipal and county governments.
     - (b) Powers
       - (1) Transfer of functions.
       - (2) Interlocal agreements.
       - (3) Liberalized annexation powers, including annexation of non-contiguous areas for new community development.
       - (4) Extra-territorial control of planning, zoning, and subdivision regulations.
       - (5) Constitutional provisions of residual powers for certain local governments.
  2. Mechanisms for guiding and regulating urban growth by bringing planning efforts and development controls into closer harmony.
     - (a) County or regional agency review of actions taken by small communities having areawide impact.
     - (b) Direct county or regional agency exercise of land-use controls within newly created communities until they reach a certain population size.
     - (c) Required integration of sewer and water planning and development of areawide basis consistent with growth needs.
     - (d) Exercise by State agency of development controls over highway interchanges and rights-of-way where local controls are inadequate or non-existent.

[4] See Peter A. Morrison, "Population Movements and the Shape of Urban Growth: Implications for Public Policy," in J. Friedmann and W. Alonso, eds., *Regional Policy: Readings in Theory and Applications* (Cambridge: MIT Press, 1975), pps. 221–43.

(e) Enactment of State legislation to authorize new types of local development ordinances and regulations including meaningful official map powers, mandatory dedication–or a cash payment in lieu of such dedication–of public facility sites, and broad general land-use standards to replace certain rigid conventional zoning standards (floating zones, planned unit development).

Source: Robert E. Merriam, "Report on National Growth 1972: A Comment" in National Growth Policy: Selected Papers submitted to the Subcommittee on Housing of the Committee on Banking and Currency, U.S. House of Representative (U.S. Government Printing Office, 1972).

A comprehensive study of the relative costs and benefits of continued urban growth in Virginia will require considerable expenditure of time and effort. In order to provide some input into some of the facets such a study will require, it would seem appropriate to sketch the highlights of a study concerning growth in Albemarle County.[5] The aim of the study is to estimate".... the difference between revenues to be received by a county government from a proposed residential and non-residential development [Hollymead] and expenditures to be incurred by the county as a result of the development."

Revenues are grouped into four categories: property related, income related, per capita, and miscellaneous. Property revenues are those stemming from levies on real or personal property. Income related revenues refer specifically to sales and income taxes, as well as to items such as utility taxes (assuming that there is a positive association between income and utility consumption). Per capital revenues refer in this context to funds apportioned to the local government by the state on the basis of population size. Profits from the sale of alcholic beverages are an example of this type revenue. Finally, miscellaneous revenues include all other items such as sales of automobile registration tags, fines, and so on.

The Urban Institute study provided estimates of increased revenues by type accruing to Albemarle County as a result of the Hollymead development. Because this development includes both residential and non-residential sectors, revenue estimates were made for both housing units and commercial peoperties. Phase I of the Hollymead development is planned to contain a total of 813 dwelling units and some 30.6 acres for commercial development, essentially shopping center. As shown in Table 8, total revenues for all sources, would total just over one half million dollars on an annual basis. From this is subtracted existing revenues from the acreage (property taxes), a relatively insubstantial $3,349.

Expenditures may be divided into two principal sorts: operating and capita. Operating expenditures may be regarded as those incurred in the provision of services to households and business enterprises, while capital expenditures include new facilities linked in whole or in part with the new development. Operating expenditures may be further allocated to households and business enterprises. Total operating expenditures for all types of services would total slightly more than $400,00. These expenditures are shown in Table 9. The bulk of these operating expenditures occurs in the area of education, re-

Table 8. Projected Revenues from Hollymead Project

	Residential	Commercial	Total
Real Property Tax	$181,195	$51,040	$232,235
Personal Property Tax	69,913	20,530	90,443
Local Sales Tax	36,298		26,398
State Sales Tax Redistribution	58,294		58,294
Utilities Tax	54,410	4,220	58,630
Motor Vehicle Registration	11,406		11,406
ABC Redistribution	9,366		9,366
Other	7,325	3,000	10,325
Total	$428,207	$78,790	$506,997

Source: Adapted from Muller and Dawson, op.cit.

[5] Thomas Muller and Grace Dawson, *The Fiscal Impact of Residential and Commercial Development: A Case Study* (Washington: The Urban Institute, 1972).

Table 9. Projected Operating Expenditures Stemming from Hollymead Development

Function	Residential	Commercial	Total
Library	$ 8,838	$	$ 8,838
Landfill	4,217	1,044	5,261
Recreation	930	241	930
Utilities	1,097	241	1,338
Law Enforcement	4,709	1,447	6,156
Fire Prevention	6,040	1,850	7,890
Health & Welfare	3,540		3,540
General Government	34,811	9,421	44,232
Prison Cost	1,625	437	2,062
Agriculture & Home Economics	2,079		2,079
Education	335,225		335,225
Total	$403,111	$14,440	$417,551

Source: Adapted from Muller and Dawson, op.cit.

flecting the usual pattern of expenditure by local governments in the state.

The final type of expenditure considered in the Muller and Dawson report is capital spending. Unlike most forms of operating expenses, one cannot automatically assume that additional population growth will require capital expenditures. It is not impossible that increases in population will actually permit a more efficient utilization of existing resources. Such a circumstance would be termed an economy of scale.

This was not the case for Albemarle County, however, where additional facilities will be required to meet the needs of the expanding population. Major capital outlays for education, recreation, a general government services substation, and a landfill site were found to be partially or wholly attributable to the Hollymead development. The latter two projects may be considered as serving the needs of both business and households, while the former are strictly household related expenditures.

The annual cost of capital expenditures depends upon at least three factors: the costs incurred in constructing and equipping facilities, the interest rate at which funds are borrowed to pay for the facilities, and the time period over which the debt will be serviced (amotization period). The Muller and Dawson study employs a 5 percent rate of interest and amotization periods of 20 to 30 years. The costs associated with the latter term are reflected in Table 10.

Annual capital expenditures are shown to be slightly less than $200,000. If the total expenditures ($417,551 + $190,832 = $608,383) are subtracted from total revenues ($506,997) it can be seen that the Hollymead development would represent a net loss to Albemarle County's fiscal position on the order of $100,00 per year.

The Muller and Dawson study cannot be interpreted to mean that urban growth is always a losing proposition. It must be realized that this study only dealt with direct fiscal impact and did not consider a variety of

Table 10. Projected Capital Expenditures Stemming From Hollymead Development

Project	Residential	Commercial	Total
Education	$120,114	$	$120,114
Recreation	4,967		4,967
Government Services Substation	4,498	815	5,313
Landfill	606	102	708
Subtotal	$130,185	$ 917	$131,102
Share of County-wide general obligation bonds	53,932	5,798	59,730
Total	$184,117	$6,715	$190,832

Source: Adapted from Muller and Dawson, op.cit.

economic and social implications implicit in growth. Additionally, the results are quite specific to Albemarle County and there is not a prior reason to extrapolate from this experience to all other cases.

The study is useful in indicating some of the ways in which urban development adds to both sides of the local government's ledger. Although it is probably impossible to replicate such a study for all of Virginia, the experience of the Hollymead development does suggest that future urban growth without restraint is not necessarily a favorable development for the Commonwealth.

DEVELOPMENT PLANNING AND VIRGINIA'S PLANNING DISTRICT CONCEPT: A CASE STUDY

BY

SANDRA S. BATIE and DENNIS K. SMITH*

INTRODUCTION

Economic development planning on a regional basis has gained in acceptance over the last decade. One rationale for development planning on a regional basis is that economic development problems[1] are complex and can affect large geographic areas; therefore, jurisdictional solutions which are not cognizant of the interjurisdictional sources of these problems are not likely to be successful. It is essentially this argument that supports the concept of regionalism, that is the delineation of geographic areas whose boundaries in some sense, "'internalize' the common problem faced by the region and, if possible, also include the resources and institutions required to solve the problems." [Sonenblum, p. 147]. Virginia is one example of a state which has attempted to institutionalize the concept of regionalism into effective planning bodies by the formation of twenty-two planning districts.

This paper reports insights gained from an economic development study in which the authors recently participated of one of these districts: the 12th Planning District, the West Piedmont Planning District (WPPDC).

This research was contracted for by the West Piedmont Planning District Commission (WPPDC) and thus was, from its conception, conducted with full realization of its importance as an input into the Commission's policy formation. This study was ambitious by most standards, completing a considerable amount of research in the short time span of 18 months. The Commission's underlying objective in contracting this research was to generate and evaluate alternative plans of development; but the resulting research output from the study will be much more useful for the latter task of evaluation than it will be for the generation of alternative plans of development. This paper will discuss some of the reasons for this as well as reporting on the study methodology and procedures.

During the course of the research, it also became apparent that the institution of the Planning District was itself worthy of some analysis.

The delineation of Virginia's counties and cities into multipurposed planning districts resulted in particular problems for this type of regional analysis. Indeed, the grouping of the four county area into the West Piedmont Planning District actually created impediments to the research and biased some of the resulting estimations. Also, the present Planning District design is such that the Commission has no implementation powers for plans other than financial or political persuasion of the local jurisdictional units. The implications of these institutional limitations to development planning will be discussed in the latter part of the paper.

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[1]Economic growth and development has evolved in meaning so as to be associated with an improvement in individuals' welfare rather than simply an increase in the aggregate volume of economic activities. Thus, problems associated with rapid urbanization are equally valid candidates for development planning as are problems associated with underemployment of resources.

Virginia's Planning Districts

Virginia's Planning Districts evolved from the recommendations of the Virginia Metropolitan Areas Study Commission, which was created by Virginia's General Assembly in 1966. This study commission examined the problems associated with rapid urbanization in the decade of the sixties. Not surprisingly, the Commission reported that they had ascertained a connection between rural and urban problems and suggested that potential remedies would need to recognize both areas' needs. The Commission was particularly sensitive to the assertions that local governmental borders failed to completely encompass the geographic boundaries of problems and that local government finances were too restricted to allow for viable programs to solve these problems. The Commission concluded:

> "any single local government is restricted in the range of its policy making and implementation by its geographic limits, its inability to control the social and economic forces outside its boundaries, and its consequent inability to plan successfully.... Desirable levels of local government coordination and cooperation can be achieved only through the establishment of area-wide agencies and procedures, greater state participation in community affairs, and expanded bases for inter-jurisdictional cooperation." [Hahn, p. 8]

The Commission recommended that the State be divided into Planning Districts which would be responsible for social, economic, and physical planning. It was envisioned that the Planning Districts would eventually be converted by local referendum into Service Districts which would not only have planning responsibilities, but would also have implementation and assessment powers.

In 1968, these recommendations for the creation of Planning Districts were embodied into law with the Virginia Area Development Act. This act required the Division of State Planning and Community Affairs to map the State's counties into "logical" districts for area-wide planning. However, formation of Planning Districts required local government ratification. Thus, it became necessary to convince local jurisdictions of the benefits of the Planning District concept. This task was made easier since the formation of the Planning District Commission meant an annual State grant to the District of $5,000 for every 25,000 persons in the District. Furthermore, an emerging trend in federal grant-in-aid programs was to require a "regional" approach to problems.[2] The Planning Districts had authority to review applications for Federal grants on a regional basis and thus could "speak with one voice for needed aid." The Planning District concept was pruported to be the key for solving overall problems. "Be Regionable" became a motta, and regional planning was billed as the "Keystone for building a Better South." Because eventual formation of Service District met with wide hostility, emphasis was placed instead on local government autonomy; Planning District Commissions would be "mediums of cooperation of existing governments." [Kidwell, Owens, Virginia].

The Division of State Planning began to delineate regions that would form the "logical districts for area-wide planning." Planning Districts were to share a common geography and problems so as to have a "communality of interest." [Kidwell, Owens, Temple, Virginia] The division studied population trends, transportation networks, trade center locations, and natural land forms and conducted 159 meetings with elected public officials and citizenry. The resulting 22 Planning District boundary delineations were an attempt to aggregate along functional ties, yet they remained subject to the constraints of existing political boundaries and thus could also be

[2]The Commission published its report on November 15, 1967, approximately ten months after the first of a series of memorandums issued by the Executive Office of the President to State governors which also suggested a single set of multicounty districts in order to coordinate boundaries of many problems. [Docksen, *et al.*, p. 21].

classified as "policy-oriented."[3] After some boundary readjustments, final planning district delineations were announced in July, 1969. Local government ratification followed and eventually all the Planning Districts had ratified charters. These Districts were charged with the overall regional goals which included economic expansion, reduction of unemployment, raising of personal income, promotion of local planning, improving governmental services, and improving the "appearance of the area." [Virginia] In achieving these goals, Planning Districts were denied implementation powers and assessment powers, although they were given specific review powers for Federal and State grant proposals, planning authority, and were instructed to provide local governments with technical planning assistance.

However, this particular institutional design, i.e., the Planning District, and the constraints imposed on it, pose formidable obstacles in achieving some multipurpose planning goals, particularly those of economic development. These obstacles are even more intractable due to inadequacies in the theory(ies) of economic development, because economic development planning at the District level, of necessity, relies heavily on proposed manipulation of variables identified by theory. Both of these assertions are illustrated by the following analysis of community resource development research in a specific Virginia Planning District.

Economic Study of the West Piedmont Planning District

One of the Planning Districts formed in 1968 was the West Piedmont Planning District (WPPD), or the 12th Planning District, consisting of Patrick, Henry, Pittsylvania and Franklin counties and the cities of Martinsville and Danville as well as the town of Rocky Mount (Figure 1).

In early 1973, EDA disaster funds were made available to the WPPDC after the destruction rendered by Tropical Storm Agnes for the purpose of "analyzing the present and potential economic, business and agricultural difficulties and manpower needs of the area" and for provision "of recommendations as to what can be done to raise the per capita and family income of the West Peidmont Planning District" [West]: one of the goals of the Planning District.

The area was characterized at the time as being a low wage but high employment region heavily dependent on textiles and furniture mills. The lack of industrial diversity and the shortage of labor at the prevailing wage rate seemed particularly distressing to the Planning Commission. Whereas many regions were struggling to limit growth of the process of urbanization, the WPPD commission was anxious to attract new industry to strengthen the existing economic base.

The Agricultural Economics Department at Virginia Polytechnic Institute was awarded a contract to undertake an Economic Development Study that would analyze possibility of expanding or improving the employment and income opportunities for residents within the Planning District. The heart of the analysis was an input-output model which could be utilized to analyze the impact of various growth potentials on employment and income. Other components of the study included a "quality-of-life" or "social well-being" analysis, industrial and business analysis and agricultural analysis.

The theoretical underpinnings of the analyses were that of economic base development theory. The available resources of the area define the production possibilities of the aggregate economy. Basic manufacturing industries such as the textile and furniture plants are able to utilize these resources to

[3]Delineation of appropriate planning regions has, usually, proven particularly difficult. Aside from recognizing the "region" as a contiguous geographic space which is larger than the "downtown" section of a city and smaller than the world, there has been only limited agreement on what constitutes an economic region. [Bowman and Anderson, p. 21]. Three major concepts have dominated the literature on regional definition. [Meyer, Fox and Kumar]. The first concept stresses *homogeneity* with respect to some combination of physical or socio-economic characteristics. A second concept emphasizes *functional integration* of a surrounding area with some central place. The third concept is *policy oriented* in the sense that regions are defined along political boundaries. Meyer, however, contends that the homogeneity concept really underlies both the functional integration and policy approaches to regional definition. That is, policy regions are homogeneous in the sense that they are entirely under the jurisdiction of one or very few governmental jurisdictions. Functional economic areas are homogeneous since they combine areas linked to a common trade center. Thus condluces, "regional definitions as established in practice often represent a compromise between these different pure types." [Meyers, p. 23].

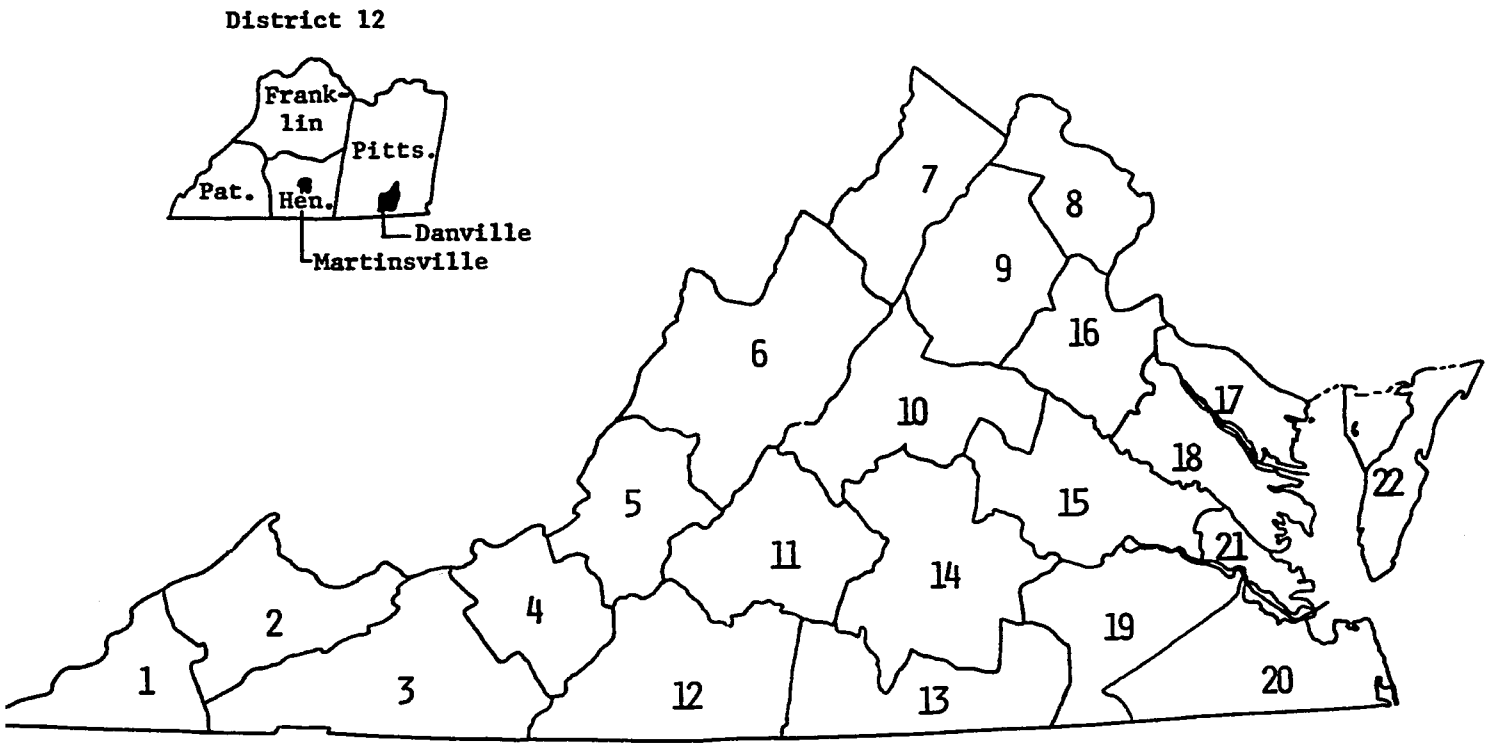

Figure 1. The Configuration of Virginia's Planning Districts.

ECONOMIC STUDY
PROJECT EVALUATION AND REVIEW TECHNIQUE/CRITICAL PATH METHOD (PERT)

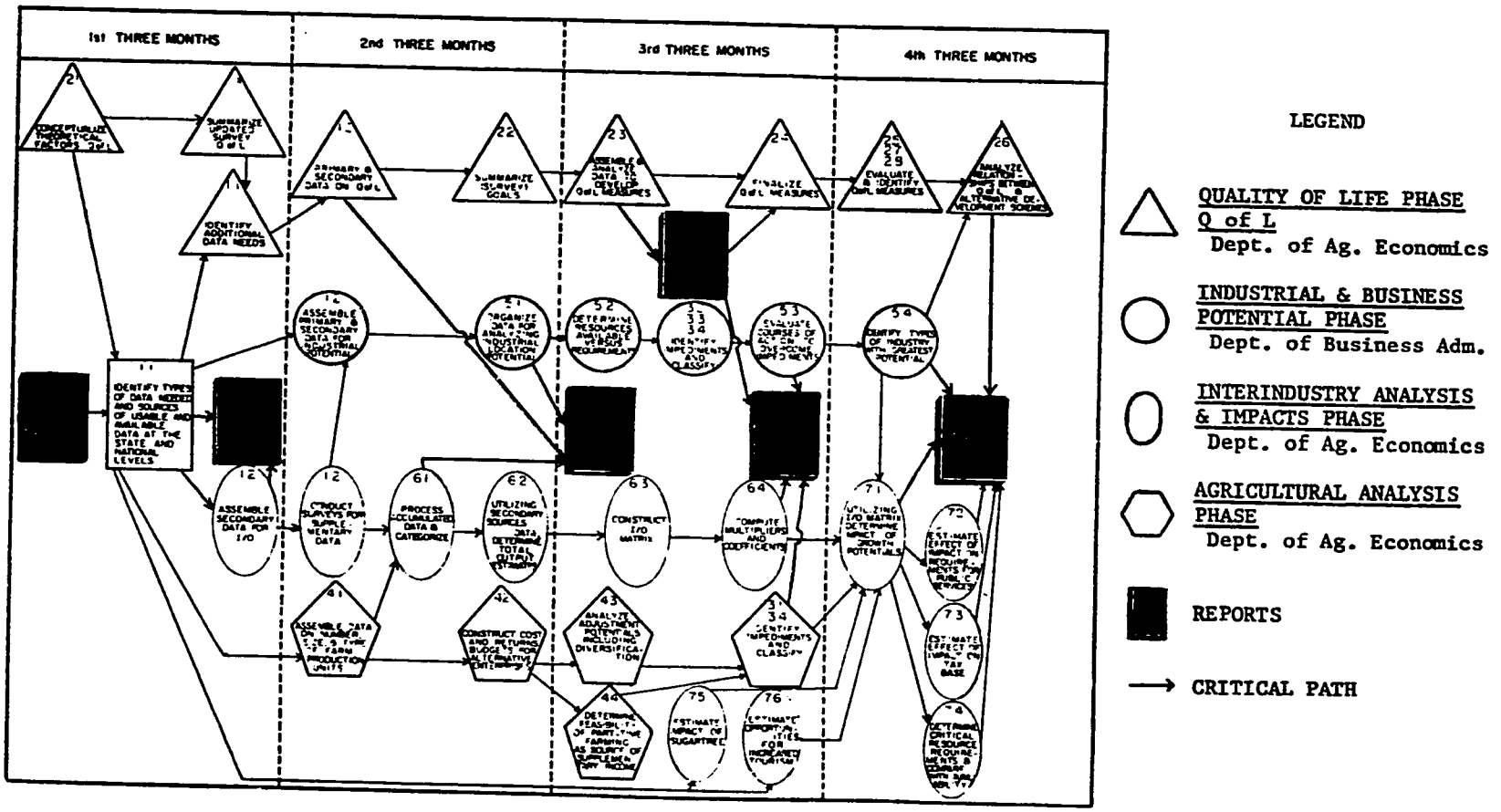

Figure 2. West Piedmont Planning District Commission.

produce exportable goods, given the comparative advantage of the region. The level of regional exports are considered a chief determinant of increases in area aggregate income and basic industry activity is considered supportive of service (non-basic) industries in the area.

The analytical structure developed utilizing this basic theory framework is best illustrated by Figure 2. The data profile of the resource base of the region together with the number and characteristics of the basic and service industries of the region were utilized to construct an input-output model of the region. This in turn was to be utilized to analyze impacts of industry changes on exports, services employment, and aggregate income.

The WPPD Study and WPPD Objectives

The result of thid study do not appear to directly aid the Commission to achieve its goals of encouraging economic development in the District.

The WPPD commission's definition of development was that of an increase in aggregate output and employment. That is, development was viewed, for the most part, as synonmous with growth.[4] Economic development goals of the WPPD commission included "encouraging and stimulating the regional tourism industry" and "maintaining a healthy growth rate in business." [West]

These development goals of the WPPd suggest that the Commission visualized their informational needs as those of "what to do." The study, however, addressed the problem in terms of "What is" and "What will be, if." This was an appropriate approach. Indeed it is highly doubtful that researchers should attempt to formula "*the* plan" of development rather the analysis should be viewed as one of "providing inputs into the local decision process, and not as a substitute for that process." [Castle, p. 83] That, however, is not a satisfactory rationale for concluding the analysis in terms of "What will be, if." [e.g., if a new textile plant, then these impacts on employment, income, services, etc.] The planning effort of the Commission needed information concerning "What could." And, although the resulting work was reasonably satisfactory in terms of "What is" and in terms of "What will be, if," little effort was made to examine "What could be.' [e.g., What realistic alternatives can the WPPD pursue in order to expand aggregate income?]

The reasons for this seem to be twofold. The first is simply the financial and the 18-month time constraint imposed on the research. Time and funds did not allow for detailed analyses of national and regional trends to gain insight into potential alternative development paths for the region.

The second reason is more fundamental. The present state of development theory is such that what policymakers can do to cause an economy to grow or to diversify is not known, anymore than we really know the linkages between economic expansion and "quality-of-life." We do not even know whether there are underlying causal phenomena for growth that will prove to be identical for different regions. Perhaps regional growth is a unique event and searching for casal regularities is doomed to continual frustration. The conventional wisdom suggests that expenditures to alter productivity of the region's natural, human or capital resources will eventually induce changes in aggregate output, employment or income. The causality chain is said to be this:

> Increases in the flow of services from human resources and natural resources affect industry mix, employment requirements, migration and ultimately area product, income and social welfare. Moreover, changes in productivity have an impact on area exports and imports, household consumption, and government revenues. Changes in the stock of natural re-

[4]The argument can be made, however, that development (however defined) should somehow imply an improvement in the "quality of life" of a region's residents. The assumption implicit in the WPPD commission's goals is that "more is better than less," that industrial and business expansion implies increased well being for WPPD citizens. The true relationship is probably not that assumed by the WPPD goals (i.e., a linear increasing function). Yet, little is known about the shape or slope of this function for any region. Indeed no concensus exists as to what "quality of life" is or what it means. [Olson] Thus, when a region "develops" by expanding regional economic product, little is known about the impact on the ultimate welfare of its inhabitants. The study, while cognizant of the need to relate development goals to social well-being, measured only the impact of industrial expansion on aggregate income, employment and services.

sources enhance the capacity of the area to increase production and exports. Finally, increases in the stock of social capital induce private investment, thus expanding the area economy. [MacMillan, p.23]

One break in this causal chain would endanger the conclusion of an expanding economy. The WPPD study, for example, found an extremely weak relationship betweed educational inputs and outputs measures. That is pupil-teacher ratios, total expenditures per pupil, and the percentage of instructional personnel holding advanced degrees correlated weakly (.31) with achievement scores, percent of high school graduates continuing to college or the dropout rate. [Shabman, p. 83] Although this does not necessarily suggest a causal relationship, it does raise doubt as to the relationship the school system has to be quality of performance of the student. It could very well be that a student's background is far more important in determing performance than any quality measures of the system. Such a finding might suggest that increased funding of schools in hope of improving the human resource base so as to ultimately improve the community economy may be based on faulty assumptions of the linkages involved.

These are some of the problems encompassed in a study that seeks to answer "What can we do ...." types of questions. There is a lack of certain essential pieces of knowledge.

The WPPD study, then, determined the quantity and quality of resources available, the basic interindustry and service relationships. It analyzed the impacts of a change in the basic industry sector on exports, income (but not quality-of-life), employment and services. It was, however, for practical purposes, mute on how to institute or induce a change in the basic industry sector initially. Nevertheless, the study did identify growth potentials and contraction probabilities in each of the basic sectors. For example, using the information concerning the resource base and analyzing national and regional trends, the WPPD agricultural sector was projected to undergo a shift away from tobacco enterprises and toward livestock and supporting enterprises.

Thus, the study provided the necessary framework and projections for analyzing a plan of development, but provided few insights as to what that plan might or could be.

Heterogeneity of the West Piedmont Planning District and Regional Analysis

Problems may be encountered in utilizing the study for impact analysis to analyze alternative plans. The problems are not a result of faulty construction of the input-output model as much as they were problems with the Planning District's boundaries. The Planning Districts were formed with the intention of encompassing common economic problems within common boundaries. This was not the case with the West Piedmont Planning District.

Because of political boundary constraints in the delineation of Planning Districts, the four-county area of the WPPD is quite diverse. Particularly striking is the extent to which Patrick County differed from the other three counties. Patrick County is a sparsely populated county of less than 16,000 persons and contains no major towns. It is a geographically isolated area noted for its natural scenic beauty but its poor road network limits accessibility. Neighboring Henry County, to the East, in contrast, is served by a major highway and contains the trade center of the City of Martinsville which accounts for about 20,000 of the County's total population of 71,000 persons. Pittsylvania County, to the East of Henry County, contains the trade center Danville—the largest city in the District with a population of about 50,000 persons. The remainder of Pittsylvania County, with a population of about 56,000 persons, is often characterized by its agricultural emphasis on tobacco production. Franklin County, the Northern-most county of the District, while considerably smaller than the above two counties, with a population of 29,000, however, bears little resemblance to Patrick County. Franklin County is adjacent to the Standard Metropolitan Area of Roanoke and is highly accessible by means of a major highway from Roanoke to the City of Martinsville.

Even if the counties were similar, this would not necessarily imply a commonality of problems. The problems of ultimate concern are those problems related to well-being. Such common problems would appear to derive from a common economic status. Thus one

might argue that for economic development planning, regional entities ought to possess similar economic characteristics, i.e., be homogenous along economic characteristics. This is not the case for the West Piedmont Planning District.

The four counties display substantial diversity. Table 1 exhibits five different economic characteristic measures and the state rank of the county in terms of the specific measurement. Henry County is notably higher ranked on all of these indicators than are the other counties; in contrast, low income and educational levels exhibited by Patrick County are evident.

A cluster analysis[5] was performed for 101 Virginia counties on the basis of the five economic characteristics of Table 1, grouping the counties into ten homogenous clusters. Patrick County was so dissimilar from the other three counties, it is placed in a different cluster; that is, Patrick is more homogenous in terms of five measures of economic wellbeing to the neighboring counties to the West than it is to the other three counties of the Planning District. Furthermore, two counties to the Northwest of the District were found to be homogeneous with the other three counties of the District.

This lack of homogeneity in the District as it is currently delineated interferred with analyses of the Region's economy and may create considerable difficulties in planning on a regional basis. Examples from the West Piedmont Planning District comprehensive study illustrate these difficulties. The study investigated the "possibilities for industrial expansion, promotion of tourism and recreational developments, commercial expansion and improvements in the agricultural sector."

An industrial survey was undertaken as part of this work and it was determined that because the basic industries were widely divergent between counties that each political jurisdiction would have to be separately surveyed. In fact, widely diverse industry and commercial development potentials and problems were discovered. To have condusted this survey on a Planning District basis would have obscured these findings.

An input-output model was constructed for the entire Planning District economy, yet the multipliers that were formulated were dominated by the two cities contained in the District. For example, the City of Martinsville is characterized by an intensive recreational establishment—the Martinsville is characterized by an intensive recreational establishment—the Martinsville Speedway which is a major national NASCAR auto race track. However, Patrick County recreation is based upon extensive activities such as fishing, hunting and hiking. These recreational activities, when placed in an amusement and recreation sector of the input-output model generated a relatively large sales multiplier of 2.56 and income multiplier of 1.55. It is doubtful that the large multipliers estimated with the major impact of Martinsville's intensive recreational

Table 1: Economic Characteristics of the Four Counties of the West Piedmont Planning District, 1970.

County	Mean Family Income	% Families Below 125% Poverty Level	% Families Earning Top 60% Total Income	Gross Wages Per Employed Worker	% of Males 25 Years and Over with 4 or More Years College
	$	%	%	%	%
Franklin	8086 (50)	23.5 (45)	33 (48)	5415 (61)	4.80 (68)
Henry	9650 (25)	15.0 (16)	36 (6)	6055 (40)	7.70 (33)
Pittsylvania	8514 (44)	28.6 (63)	33 (39)	5356 (63)	6.20 (48)
Patrick	7333 (74)	24.2 (50)	35 (12)	4679 (85)	2.40 (100)

( ) rank in state out of 101 jurisdictions.

[5]The technique of cluster analysis computes a discriminant function using the variables provided and attempts to maximize the variance between clusters while at the same time minimizing the differences between members of a given cluster, Thus, observations which fall in one group can be termed homogeneous with respect to the variables used. While the use of 10 clusters is an "arbitrary" number, it was felt that it would be sufficient to identify significant differences between areas and yet was not so large that it magnified insignificant differences.

facility are representative of recreation multipliers for Patrick County. This type of bias is present throughout the model. Overcoming this bias would require breaking the model into an unwieldy number of sectors. For example, the recreation sector would at a minimum be required to be separated into intensive and extensive recreation sectors. Such a model would be prohibitably expensive for the WPPDC to construct. Thus, it appears that the institutionalizing of the regional planning concept in formulating the Planning Districts has not resulted in any substantial improvements for this type of economic development analysis and may in fact constitute an impediment to such analysis. The problem is further accentuated by the fact that policy and program implementation powers rest with the local jurisdictions and therefore local jurisdictional plans that are formulated on the basis of informational inputs from such an analysis would be similarly misguided. The problem is simple that delineation of regional boundaries to meet multiple development goals are not adequate for pursuit of individual program objectives.

Heterogeneity of the WPPD and Implementation of Plans

The diversity of socio-economic problems also compounds the difficulties of implementing any development plan. The law specifically with-holds implementation powers from the Planning District. Implementation rests with the local governmental jurisdictions which comprise the Planning Districts. The Commission then is left with a classic collective participation problems: how to raise the net benefits of participation in the plan so that local governments will support implementations. This is particularly difficult in a rural county setting where the acceptance of planning as an appropriate local activity by rural citizens, leaders and government is half-hearted at best. (Hahn, A., p. 44). When the region is also composed of diverse socio-economic situations, there are few opportunities to cooperate on those problems where no jurisdiction is forced to give up more than it receives. And finally, the general mission envisioned for the Planning Districts is of itself bound to raise jealousy and suspicion from the local governmental units. The long-term mission was to gradually convert Planning Districts to Service Districts which would undertake some governmental functions currently controlled by local government units. Local governments have the power, however, to interfere with this evolution, and at this date no Service Districts have been formed.

Obviously, one offsetting power the District had was the power of the purse. Local jurisdictions do see benefits from participation in plans that have federal or state funding. However, with the advent of revenue sharing, Planning District review of federal grant proposals is no longer as essential, and the benefits for local government support of Planning Districts has diminished. It now appears to many local government bodies that the Planning District Commission is simply imposing another layer of governmental administration without generating many perceivable benefits to local governments.

The result of this discontent in the WPPD has been the resigning of the former director after failure to receive adequate support from the Commission members. Simultaneous with the appointment of the new director, the Commission passed a resolution opposing proposals to allow planning districts to implement some programs, recommending that the duties of the regional planning commission remain limited to planning and suggesting that the Virginia Area Development Act be amended to delete provisions for service district implementation powers for any planning district and prevent "the promulgation of additional layers of government in the commonwealth."

Obviously, research that endeavors to isolate policy variables, (variables capable of manipulation by policy makers) is apt to be frustrated in such an environment. The sceptic would suspect that much of the analysis then is just so much data to adorn library shelves.

The Study's Contribution to the WPPD Planning Efforts

This is, however, too harsh a conclusion. The fact that the study did not provide a smorgasbord of alternative paths to development is not an indictment of the study. If one views the Commission's responsibilities as not that of "set goal–select action,' but rather of "identify the problem–understand the problem–evaluate the problem–set goals–select action," then the usefulness of this

study to the Commission becomes more evident. It can indeed aid in all five steps, but not in the deterministic way of listing alternative actions. Rather the study provides the WPPD with a rigorous approach to problem analysis, as well as providing a powerful impact analysis tool. It forces the planning staff to consider fully the implications of proposed policies, and as such, provides valuable information. For example, the planning staff was considering policies to increase tourist traffic in the District. The study forced planners to consider the magnitude and incidence of the benefits and costs of increasing the tourist trade, as well as analyzing the probability such trade would indeed increase with the implementation of the proposed policy, and the implications to private entrepreneurs if the additional tourists did or did not materialize. Here the study aided substantially in identifying, understanding and evaluating the problem. Now the WPPDC is in an improved position to use this information for formulating specific tourism goals, and they are able to utilize the input-output analysis, with appropriate caution, to determine the impact of increased (decreased) tourism *The WPPDC can also utilize the information for informed conflict resolution between the jurisdictions that comprise the District. When viewed in this propective, the study is extremely valuable.

CONCLUSIONS

Thus, the conclusions that can be gained from the author's experiences in this study appear to be these:

Virginia's attempt to institutionalize the concept of regionalism by the creation of Planning Districts has not been without problems. This is partly due to the fact that the concept of regionalizing planning is normally based upon achievement of single purpose objectives, but Virginia's Planning Districts have a multi-purpose mission. In some sense, the Virginia Metropolitan Area Study Commission was guilty of the fallacy of composition when it suggested that planning for a wide range of overall problems can be achieved only through the establishment of areawide agencies and procedures: what is good for a single problem may not be good for all problems. Thus a concept that probably has validity, regional planning, has lost impact in implementation.

As a result, local governments are not likely to voluntarily participate in this collective planning activity until they perceive that there are net benefits in their doing so. This does not appear to be the case in many Planning District situations, and since the local governments do have the power to sabotage the Districts—they are apt to use it if they feel their autonomy the least bit "threatened" by the planning efforts of the District. Thus, it would seem that there is a need to reexamine the way in which Virginia has chosen to institutionalize regional planning both in terms of the capabilities of the fixed regional body in dealing with developmental, social and environmental problems and in terms of the incentives for local jurisdictional support. These capabilities appear to be particularly taxed in the case of economic development planning as opposed to, say, a sewerage provision plan. The delineation of the West Piedmont Planning Districts boundaries to facilitate regional planning on the basis of communalities of interest has not achieved its prupose, and the existing boundaries may actually create impediments to conducting economic development research. Although not all Districts would share this problem, the WPPD situation is not unique.

Finally, the Districts planning efforts will continue to be hampered by the failure of economic development research to provide confirmation of the assumed linkages between the manipulation of policy variables and the ultimate impact on community development as defined in terms of either community welfare or economic expansion. Until then, non-tautological, deterministic answers to the Commission's question of "What could be" remain elusive; any guidance is, at best, of a conditional nature. Despite these limitations, regional economic studies such as that reported on here provide substantial information from which to develop and to choose between alternative plans of development and to evaluate the impacts of various exogenous or induced changes in the economy. It would not seem advisable, however, for each of the 22 Planning Districts in Virginia to develop such an indepth input-out-ut model for their planning purposes. Rather, the information obtainable from a few such studies would appear to be quite transferable to new but similar situations.

The experiences of the WPPD should not be viewed as an indictment of the Planning District concept. They do, however, suggest the need for a rigorous analysis of the institutional design with the goal of providing new criteria for the design of regional planning institutions.

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US-AID PROGRAMS

BY

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As I have been listening here for the last two days of the conference discussions, I was trying to think of how we usually do not apply all these concepts to the way we actually do business in AID. I thought that perhaps I would discuss some specific problems with which we are working in our program, in terms of specific projects, which we hope to authorize this year or next year, and try to see where and where not some of the concepts we have been talking about fit.

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I am startled, as I was going over the list of possible AID projects and programs, at the tremendous diversity of approaches that arise in any particular situation and in any particular country. I think that no matter how much we theorize, we never are in the position to deal simply with critical factors in rural development, with basic appraoches or methodologies. One never arrives in a country situation at the beginning but always enters that situation in a process of history, or a process of institutional development, or a process of on-going programs that one has to relate to. And that is so clear, as one notes the very different kinds of programs, structures and approaches to very similar problems that come up in Africa. I would like to indicate some very different kinds of projects that are in process of design, even though all of them are aimed at the things you've heard in the last two days: the rural poor, small farmers and, in the broad way, rural development.

Let me start with some issues of philosophy, which we are facing right now in our project design efforts. Dr. Adams touched upon some very important issues in his address yesterday and I think he has succeeded in making all of us in the African Bureau critically aware of them to the point we have had to think very hard about exactly what it is that the U. S. does have to offer in its assistance program. The Ambassador, at lunch, raised some of the same questions in his address. For example one has to be careful in the design of an assistance program to ask oneself what is it that we, the United States particularly, have to offer. Someone once stated that at least we have money to offer. However, we are reminded by Congress as Dr. Adams pointed out, that the resource transfer, per se, is no longer the name of the game. We are supposed to use resources for particular purposes: to promote and generate particular types of development, especially with the small farmer. If we say we have technology, technical knowledge and experience to offer, then we face the question of how transferable that experience is; and, if it is transferable, how will we transfer it without simply substituting American managers in place of persons in the host countries to run the program which is really only a substitute for development. Finally, agravating the problem, new projects in AID, because of our own internal requirements, are designed with the paraphernalia of data, information systems, and controls to suit our own programming system, involving us thereby in a lot of things (and expense) which presume, perhaps, we have more to offer than we really do.

So we are trying to find a balance whereby United States assistance can really be more catalytic, more promoting of local genius and experience, opening up opportunities for that genius and not getting in the way. Also, providing only that kind of input which is really useful for growth.

One of the countries where I think we are trying to use some experimentation with systems that do not get in the way of the country and hopefully which will help is Mali. We are trying to design programs of assistance in Mali which rely very heavily on Malian Planning, Malian directions, and Malian administration. In the livestock sector, the Malian government has a very clear concept of how it wants to see the sector developed of the different zones and the different areas. But there is a great deal of experimentation going on in Mali as to how to achieve certain of the objectives because the conditions are not conducive to systems developed in either the U.S. or Europe. How does one achieve a rational land use system where persons move hundreds of miles, and in cases serval hundreds of miles each year in herding their livestock, and where the herders do not necessarily own any one piece of land? How does one develop land use controls under these circumstances? How does a country develop new lands, such as those infested by trypanosomiasis and keep them from simply being over-run and over-grazed by people who are land hungry and who would move into those areas as soon as they were cleared? In the livestock sector, we have designed programs with the Malian government in which a series of experimentation will take place in land use planning in semi-nomadic areas, and land clearing in perhaps, the trypanosomiasis area; in marketing systems, some using small farmers to raise finished cattle, others using the traders, others using the herders as marketing agents to develop a whole series of experiments that would not only broaden experience but improve the various systems for finishing and marketing of livestock. What is intriguing about the program in Mali, which has frankly taken us years to design, is the degree to which the planning, the leadership

and the direction has been in the hands of the Malian government, in the Malian Ministry of Production, rather than in hands of U. S. agricultural and livestock experts, etc. U. S. advisors have played a major role in the design, but truly as advisors and through an interactive process in which proposals, concepts, and projects ideas from both sides were examined, refined, or discarded. In the end there was a program about which the Malians were enthusiastic, and which they felt clearly theirs.

We're trying the same thing now in the field of agriculture. A number of efforts have already been underway, in Mali, to expand agricultural production in some of the drier areas, and to expand small scale irrigation along the Niger River. What we are in the process of doing now to help in crop irrigation is to design programs to support the Malian efforts without having a large number of Americans involved. What we are hoping to do is to provide, from time to time, experts to conduct seminars in the country, or in other ways to interact with Malian officials in the field to come in to discuss their problems on small-scale irrigation, to review the problems they have had in marketing, to go over the number of issues they have had in expanding production programs and to get help on them. But never to substitute the Americans out in the field for the Malian administrators of the program. The evaluation of the program will also be in the hands of the Malians And the problems that are uncovered will be problems they uncovered and discussed with us and with themselves.

Projects such as these in Mali do not always have very specific, pinpointed objectives, and do not have pinned down in advance all the details of what is to happen from year to year. Consequently, they are very difficult for us. They are difficult for us because lawyers question whether they meet the requirements of obligation, auditors question what it is they are supposed to audit when it is over, and production-oriented people question the product. In these projects, of course, the product is as much the process of farmer or herder involvement, and the process of government growth in experience, as it is growth in output. And that is difficult to measure. But we are moving in that direction.

By contrast and quite a contrast, let me turn to the type of programs we are designing with the government in Senegal. There, as many of you know, the government is faced with a very severe and chronic rice shortage. It is anxious, therefore, to develop the potential of the Senegal River. There is a large, long-term plan for construction of dams to regulate the river, and provide both power and irrigation. Even prior to construction of those dams, one is faced with an enormous task in the development of land for irrigation, the training of people, farmers, extention agents administrators, etc., so that land can be converted into intensive irrigation farming systems. Marketing arrangements need to be developed. We are looking at some of these projects and looking at potential development of perimeters along the Senegal River which might be so developed. The projects along the Senegal River will, basically, transform the whole way of farming of people in that area. They will go from one traditionally grown crop a year to two intensively cultivated, irrigated crops. There are areas along the river where not many people are settled and new people will have to come in, involving a whole new sociological situation. There are areas along the river where the development of intensive irrigation will break up patterns of livestock crossing the river, and use of the land. In other words, what is being talked about in Senegal is the major transformation not only of the farming structures of that region, but of the ways of life of the people and their whole relationship to their work, their land and to the markets in Dakar.

In response to this prospect, we are engaging first in studies which are themselves larger than many projects to examine the technical and economic feasibility of a single perimeter development in Senegal will require 9 months, and cost over $500,00. An environmental analysis, to study environmental effects of the total development of the basin, which the United States has agreed to finance, will cost over $2,000,000. The actual projects which we and other donors are contemplating, could cost $10–15 million each, certainly an enormous and still controversial capital investment. So what is being talked of in Senegal is something radically different than the designing in Mali. Yet it points ahead, probably 10 years, in Mali when the Niger River begins to be fully regulated and developed. One could then be embarking on similar very extensive programs. However, hopefully the human re-

source base, and the level of farmer and government experience in Mali will have been greatly advanced by then, overcoming some of the problems now present in the Senegal Basin.

A third quite different approach is in the AID program in the Cameroons. Here we began from a third direction: The desire to do some modern land use analysis and studies, making use of satellite technology to develop better knowledge of the land base and better systems for alternate land usage in Northern Cameroons. The idea was originally that this knowledge would become a foundation for a new livestock project of the Cameroon government in the North. But gradually the idea has become more complicated as one looks at alternate land uses for agriculture as well as livestock. Consequently, the program is growing into a very complicated integrated rural development approach which will involve agriculture, livestock, and a variety of other efforts over several years. In sum, we started from the idea of helping to introduce the government to simply better land use knowledge and practices, through use of modern technology, and it now has grown into a very broad rural development planning program for the whole Northern part of the country.

Finally, a quite different approach to agricultural development is being utilized in three countries of Eastern Africa, which we call the Sector approach. In AID, the sector form of assistance does not involve any particular project but is designed to support a broad sector program of a country, whether agriculture or education or health. It is based upon reasonable assumptions that certain plans and programs developed by the government are sound and can be carried out, and with additional financing could be carried out even faster or both. We have had a great deal of agony in the agency over sector programming, particularly with the new directions mandate by Congress, which say that it is not just agricultural production nor overall agricultural policies with which the United States is supposed to be concerned, but rather the small farmer, the equity aspect of agriculture, and the participation of farmers in the development. This process leads us, quite frankly, into a sensitive arena of analysis with the government analysis of not just their programs and policies in the sector, but also the rather detailed analysis of how the programs are going to be carried out so that we can satisfy ourselves and Congress that our lending will indeed reach this very selective target of small farmers. This in turn means setting up a whole different requirement analysis in all three countries in which we use this form of assistance: Kenya, Ethiopia, and Tanzania. We are engaging this fall in extensive analysis of the various sub-sectors in agricultural programs in each country in order to develop a basis for AID agriculture sector lending. The sectors in each country will have a very different structure., involve a very different approach or philosophy, very different administrative systems, etc., and, therefore, what will come out of each country will surely be different. Put another way, the institutions upon which the poor will depend in each country will be quite different. Yet, presumably, in all three countries, the sector form of assistance which emerges will be supporting the same general objectives of small farmer production and productivity.

Now, if our appraoch to agricultural development and rural development is as diverse as this, even more diverse and perhaps filled with more uncertainties is our approach to rural education. There is a tremendous emphasis in AID in recent years on getting away from simply the formal educational system and dealing with educational systems that will reach more people functionally, e.g. more targeting on the poor and particularly the rural poor. There has been a lot of discussions, a lot of research, and a lot of writings on the question of non-formal education. But, in a recent seminar in the Cameroons, a number of African educators preferred to dispense with that term. They dealt instead with what they called rural education which overcome the dichotomy placed between formal and non-formal systems of education. The problem is education for rural development, and one should not make presuppositions as to the vehicle, formal or non-formal systems, one uses to achieve that objective.

One thing we are learning in the field of education is that we may have even less to offer directly in this field than in many others which makes our design of projects more complicated. I think one of the very exciting and interesting programs now being developed in East Africa is a limited program of

assistance with the Adult Education program in Tanzania. This is a very exciting, innovative program in which we frankly expect to learn more than we give because what is going on in that program will help teach us a lot about the way one carries out adult education in rural areas. And we expect to make only a very modest contribution in funds and limited training, to that program. Frankly, we are going into it as a dialogue for our own enlightment as well as for whatever assistance we can provide.

In Senegal we are working with the government on a problem that is very common among programs in rural education and which is very complex. That is: how does one link the concern with education and with popular participation—a concern with helping people to see their real interests and act upon them—with a technical form of extension and farmer training, etc., which comes from a different group of people and institutions¾ I suppose we have had the same problem in the United States, I do not know, but I know in many developing countries you have two lines going out to the rural areas: the technical line coming through the agricultural ministry or similar ministry, providing techniques, formal training, etc.; and a different group of of people are saying, no, we want the farmer to think through his problems, and who use group methods and animation techniques. Often these programs overlap and duplicate each other. So that the farmer is hearing one group on how he might take more into his own hands, but this group has very little technical information to offer him. And another group offering technical information but not helping very much on how he gets control of that technical information and technology. In Senegal after months of discussion with both the livestock service and the Promotion Humane Program, which is a program for rural education, we are helping some experimental programs to bring these two approaches together. The Promotion Humane Education "galvanizing" effort will work closely with the extension service to see if one can get a more hamonization of both efforts in rural areas selected for development programs. It will be a difficult program, and its success or failure obviously will ride on what happens between Senegalese administrators in the two programs rather than on what the U.S.provides. I think our assistance will be encouraging toward the direction of harmonization and experimentation rather than any clear solution to the fundamental problem.

A third kind of rural education we are beginning to get involved in, particularly in the Sahel, and perhaps in Southern Africa as well, is a kind of dialogue, so to speak, among people who are closely involved in rural development efforts, that is the farmers and the herders themselves, and rural government workers. In both Mali and in Chad there are experimental programs getting under way which have various terms by which some people call them, e.g. shade-tree seminars or herder seminars and farmer seminars. There are quite a variety of names, but the essence of the program is a system of dialogue between herders or farmers and government in developing the particular types of rural development programs that will be implemented.

In Mali, for example, there will be an effort to meet with the nomadic and other groups that use the land in a particular area in which we are assisting and ask them how they see a system of land usage working and being enforced in that part of Mali, since they use the land but they also move in and out of it. There is a counter approach, that we are trying to get away from, and that is to pass a law that tells the people how they should use a piece of land. The Mali government, with our assistance, is starting in other directions We are trying to meet with people who use the land and ask them how rational land usage can be developed and enforced under the circumstances of the area. The beginnings of that kind of program is being developed also in Chad. Where one goes from here, and how successful these programs will be, remains to be seen. But you can see, I think, from the kind of programs we are talking about, how delicate and difficult the process of what we call project design is, because our internal AID design requirements ask for a lot of analysis and data, and specific implementation plans, but the nature of the problem involving the people, and the process of solution to their problems is something that has to take place out there. We do not have very specific solutions to them and it would be a mistake to compose them in advance.

Let me also mention beyond these projects, some of the studies that we are undertaking that we hope will lead to new kinds of projects in the coming years. Presumably, all our projects are based on prior studies and sector analysis. That is the theory, but you have to sometimes work the other way around. But there are some studies underway right now which we hope will provide a basis for future programs, whether it is sector lending or specific projects or other approaches. One such study I would like to mention, because it is a unique one indeed, which we do not really know how we are going to do yet, but which we think it is important, is a manpower study in Southern Africa. We are very concerned that there is a style of assistance that may be counter productive, and that is a style of substituting a great deal of expatriate personnel for Africa because there does not appear to be trained Africans to manage the projects. We hope to be undertaking, in Southern Africa, some so-called manpower studies which are not the traditional kind of manpower studies. Rather, they will help us design projects in all sectors which rely less in the future on foreign personnel and rely more on promoting the upward mobility of the people in the area.

Another form of study that we are undertaking is an agricultural sector analysis which are more program-oriented. What we have discovered in utilizing sector analyses is that they have not necessarily provided a program strategy. We just have to redo our studies again for that very reason, because in them we have a lot of facts and figures and a lot of background analyses that do not tell us where to go in terms of solving the problems identified.

Let me close with mentioning three issues which I think are very common to all the of project design efforts about which I have been speaking.

One is, how do you design programs to really get the kind of involvement with farmers, herders, or low-level people in the government? How do you get that kind of involvement in the project when you design it? We have talked about it a great deal, but are generally committed to conceive of the program and the solutions from the outside, already inhibiting some of the participation, and the inputs from the target people you do not even know very much about.

The second issue is the one on which we are hopefully progressing in Mali and other places: how do you structure a program that maximizes local experiences? Learning by experience, using but not substituting outside experts in that learning process is one way. Yet we have difficulty in our own internal reporting requirements in making the thrust of the project, the experience that people in that country gain, in terms of dealing with agriculture and other problems, rather than simple technical achievements.

And finally, a third problem that I am afraid has received much too little attention in the focus on the rural poor. Again it is a problem about which the Ambassador spoke at lunch, and that is: where are the markets to which the rural poor are to be linked? It is one thing to talk about ecological change, to talk about new seeds or fertilizer, both of which have to be purchased by the farmers, but it is another to say: where are the markets for soybeans or for rice? Where are the market structures, not only in these countries but externally, to which the mass of small farmers can relate? This is a problem I am afraid on which we have yet to focus our attention.

DR. H. J. BATTLE*

The Virginia State College–University of Science and Technology linkage became a reality when, in January, it was approved by officials of both countries and also by the Agency for International Development. This has been the first time we have been able to get back together all the representatives to discuss some of the things we will be doing in Ghana. Our remarks at this time will have few details since the linage took place only in January of this year. What we will be saying, largely, will be plans and, perhaps, at our next session we will be able to say more about what we have been doing. So with that in mind, I'm going to start by asking Dr. Appiah to come forward.

*Conference Co-Chairman and Director of BERD, Virginia State College.

DR. JOHN ANIM-APPIAH*

I bring you greetings from the people of Ghana, from the Vice Chancellor, Dr. Bamfo Kwakye and from the University of Science and Technology at Kumasi. I represent the University of Science and Technology (UST) with two other gentlemen whom I am happy to introduce to you. First, Mr. Daniel C. Asante, a graduate student at the University of Washington, and Mr. Albert Essel, a graduate student at the University of Iowa. Our presentation will be a review of Economic Research and Development.

I need not mention why we are here at this conference or for that matter at Virginia State College as a whole. In January of this year, an Economic Linkage was formed between our University and that of Virginia State College. The overall objective of the linkage has focused on techniques for helping rural communities to attain a higher standard of welfare by making available the appropriate technologies to communities so that their income and the quality of life can be improved. These objectives are to be prusued through various research projects and application of the results in areas of agriculture, health, commerce and industry, as well as in other socio-economic areas.

The main objectives in agriculture are to promote development of area agriculture through the use of appropriate techniques, including improved seeds, machinery and fertilizer; to promote better functioning of the existing agriculture extension serivces; construction of access feeder roads, and the development of storage, processing and other marketing facilities. These objectives will involve certain specific duties, among which are: conserving present land use; evaluating the agriculture potentiality of the rural areas, including studies of soils, climates and topography, the adaptive and demonstrative trails of crops and livestock better suited to the rural areas.

From development economic studies, we could show common patterns and indicate proper livestock combinations which would help to raise farm income. There is a need to conduct studies of the present processing facilities and marketing channels, and to identify the crucial bottlenecks, so as to be effective. These studies can also include the appropriateness of the agricultural extension activities.

In the area of commerce and industry, in order to promote the development of commercial and industrial use, the introduction of village handi-crafts and small-scale industries, and the provisions of instructions in the techniques of small-scale business are needed. As it involves the utilization of local building materials and mobilization of local savings, these objectives, in the areas of commerce and industry will involve the following specific activities:

(1) Measure of base line research and extension activities in the area of health. We believe that other essential steps for utilizing the economic potential of health standards has to be reached through improved environment, sanitation and the provision of water and improvements in nutritions. These objectives, in the areas of health, will involve the following specific activities among others: a survey of nutritional habits in the area; studies on nutritional deficiencies; and a study of the incidents of postnatal death in the area.

(2) In the other socio-economic areas, our objective will involve analyses of the characteristics of the local population, indentification of basic products, training of local units, assistance in the formations and strengthening of the activities of production, marketing and credit and housing throughout the area. These activities sound very ambitious indeed, and, as if, the University of Science and Technology and Virginia State College are going to take over the government of Ghana in terms of a total economic development program. But this is certainly not the case, we are well aware that both institutions do not have the resources to do this.

Instead of spreading ourselves thin over such a wide area, we wish to concentrate our

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efforts in one small area at a time. Our immediate target area is the Savannah area of Northern Ghana, specifically in Kumbungu. The Kumbungu area is a small area 30 miles Southwest of Tamale, the Northern Ghanaian capitol. It has a population of about 500 thousand and a population growth rate of about 1.7 percent per year. Ninety percent of the employed male population in the Kumbungu area is engaged in agriculture while the majority of women are engaged in domestic activities.

In this area, as in many other areas of the country, the people are trying to help themselves to wrestle a living out of nature. However, the true balance requires turning directly to the side of the present administration for improvement of the area. Improvements are also required in health, education, and all the social amenities that go to improve the quality of life. Now, at this stage, I should like to point out that we at the University of Science and Technology can command the resources necessary to carry out such studies. We have a faculty of Agriculture in several departments, including my own department of Agriculture Economics. We have a faculty of Social Sciences of 45 members, a Department of Land Economics, Social Studies, Economics and Industrial Management. We also have a faculty of Engineering with Mechanical, Civil, and Electrical Engineering in our technical departments, and the Department of Architecture. We also have a faculty of Science, Fine Arts, Pharmacy, and Medical Sciences. Two other organizations associated with the University, which I shall mention, are the Land Administration Research Center and the Technical Consultancy Center. In carrying out the activities of the linkage, we have the Management Board, comprised of the chairman of the Department of Agricultural Economics, Economic and Industrial Management, Mechanical Engineering, Land Economics, Regional and Development Planning, and the Technology Consultancy Center.

Other aspects of the linkage concerns the exchange of faculty and student members. One of our students is already enrolled in the Master of Economics Program at Virginia State College. Another student will be enrolled in January of 1976.

In terms of faculty exchange, arrangements are being made for Dr. Joshua, from Virginia State College, to join the faculty of UST for one year. Perhaps I should also mention at this stage, the visit of Vice Chancellor of UST, Dr. Bamfo Kwakye, to VSC in May of this year. A reciprocal visit is expected of VSC's President in the not to distant future. We at UST are indeed happy about this linkage and have high expectations about the outcomes. We expect that some of our faculty members will have the opportunity to become acquainted with the research and approaches to the problems of the College here at VSC. It is our expectation also that the staff at VSC will become acquainted with the work we do at UST, in terms of participation to the Ghanian community, and make useful and meaningful suggestions. We also value the opportunity of our students to be able to share views with students of VSC. It is our expectation that this will broaden the student's perspective. Therefore, in general, we expect that the linkage will broaden our options and lend new dimensions to the wake of the challenges of the Ghanian community.

I will mention at this stage, a couple of the programs or activities that we are engaged in at UST. These include the study of Enterprise Combinations and Capital Requirements in Northern Ghanian Agriculture. The Study of the Customary Land Practices and Settlements that Prevail in the Kumbungu District, including a study of the socio-economic conditions and the human equality of the area. These are projects which will help us to develop studies on the system of management for the rationalization of land use. The Land Administration of the area and a strategy for development of the area is included. There are also projects in housing activities, and one on the incidents of nutritional deficiency. Two programs that I wish to mention, which we are engaged in also, are the adaptation of indigenous machines for the harvesting of rice in the Kumbungu area; and the organization of a project of farm cooperatives which will be engaged in palm and citrus oil as a basis for a small local soap manufacturing plant. There is a lot of work beyond what I've said and I send an invitation to every institution here to come and work with us in Ghana at UST.

On behalf of the University of Science and Technology and other institutions of higher learning, I'm sure we can all have an appreciation for the type of problems and work that lie ahead of us. Thank you!

CHARLES D. WHYTE

My remarks will be very brief since it is Friday afternoon and, I am sure many of you have flights to catch for distant places. This conference actually marks the beginning of a new program. The provisions of our Virginia State College–University of Science and Technology Linkage program calls for Virginia State College to host an Economic Development Planning Conference during the month of July. This being August 1, finds us one day past July, but this objective has been met. The University of Science and Technology is to hold a similar Economic Planning Conference in July of 1976. Virginia State College in terms will hold a seminar in Economic Development during the month of September in 1976.

What Dr. Appiah has outlined to you is a set of proposals, from which he and the BERD staff hope to develop specific research projects during our post-conference session. I think that the program he has outlined gives us a sense of urgency to develop projects which can be implemented in the near future. Obviously, and in view of what Dr. Lyman has siad, and in line with our own thinking, we shall develop projects jointly with the host country so that the people there will share in determining their development needs.

Therefore, what I hope we will get out of this linkage is that both institutions will be effective in a mutual way in focusing on problems that continue to plague rural people and small farm and nonfarm businesses. Our objective is, of course, to enhance the capacity and capabilities of both institutions to minimize and resolve problems that affect the small farms and rural nonfarm business units.

MICHAEL JOSHUA

During the last couple of days, we have heard from a cross-section of the individuals here, including professional and social scientist and public officials. Also, we have heard issues relating to the new approach to economic development and the concern for the rural poor. I think that in that light, this discussion is a bit in conclusion to the exercise heard, in that we are gradually trying specific experiments to pur into play some of the suggestions that have been put forth here. I am pleased to be associated with the University of Science and Technology in Ghana and to go there to serve on a teaching assignment to undertake research activities.

Since I believe that the environment should generally monitor what we use, I think we need to learn and study the environment and, hopefully, when I return we might have a gathering of this kind again and I may be able to report on a model that is relevant to the particular situation and one that may be acceptable elsewhere.