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9. ABSTRACT
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Presents an overview of the existing health problems in Africa and of the factors which relate to solutions to these problems. This study discusses possible alternative actions which might have an impact on the problems, and it also evaluates the possible effects of this intervention. Three aspects of health problems encountered in Africa are: (1) the problem from the quality of life, equity, and economic development perspective; (2) health status, resources and programs in Africa; and (3) socioeconomic development and income distribution. Because an increased income level, shared in an equitable way, is one of the major objectives of economic development, improved health should receive substantial emphasis. Due to poor nutrition the people of Africa are afflicted with a wide range of diseases. This report discusses health status and nutrition and presents tables with data on major disease problems and caloric intake. Chapters assess the extent of the activities of multilateral and bilateral agencies in the health programs of Africa by examining health intervention, the rationale for it, and areas in which this action can have a health impact. Such areas are the health services sector, nutrition, family planning and demographic change, education, and agriculture. Alternative intervention approaches are also presented. Conclusions from the study concerning recent A.I.D. policy toward health in Africa are: (1) More should be done to help people attain health and education levels that will allow

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them to develop their own institutions. (2) In order to gain acceptance, a population control program must be part of a broader based preventive health service program. (3) Economic development programs need to place more emphasis on contributing to the improvement of the quality of life of people in developing countries.

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HEALTH IN AFRICA

Sector/Problem Analysis Division
Office of Development Services
Bureau for Africa
Agency for International Development

January 1975

Prologue

The development of the background paper and the "Health Strategy for Africa" for the Bureau is the outcome of the efforts of a special Task Force and others. Included in the Task Force were Antonio Gayoso, Chief of the Sector Analysis Division of Development Services, Jean Pinder, Consultant to the Division, Herman Marshall, Health/Population Officer, CWR, Richard Uhrich, M.D., DHEW, William Walsh, DHEW - the first draft of the paper was prepared by David Dunlop, Health Economist, Vanderbilt University, and Karen Lashman, DHEW.

The background paper is designed to present an overview of the existing health problems in Africa, and of the various factors which impinge on/or relate to developing solutions to these problems. There is then presented possible alternative actions which might have an impact on the problems described and an evaluation of the possible effects of the intervention. It is on the basis of these alternatives - together with Agency policies - that the Health Strategy was developed.

The Office of Development Services wishes to express appreciation to all who participated in the Task Force and other persons and Offices of the Agency who have contributed to this activity.

Conclusions and Recommendations

The Africa Bureau will support health programs in the following categories:

A. National Health Delivery Systems:

The development of national systems with emphasis on integrated rural health delivery systems:

AID program inputs could focus on health planning, personnel systems and training (using new AID-supported techniques such as Medex, etc.), supervisory and management training, management and administration at the national level, and financial analyses of long-term costs/benefits. AID support could also include sector grants or loans for lesser elements of system in support of well-planned national programs which have an integrated approach and coordinated donor support.

In most cases, such programs would be developed on a phased basis, so that governments can manage full responsibility for program; but longer-term planning, training, self-help and assistance inputs should be planned ahead as part of the sector approach as represented by the DAP process and as a basis for evaluation of various inputs.

B. Disease control and other health programs in support of rural development efforts:

Environmental analysis of health factors and health programs in relation to development programs, for example, control of water-borne diseases such as schistosomiasis, trypanosomiasis and other health factors should be included on projects addressing, inter alia, the opening of new lands and/or the investment in greater productivity of rural areas. Some such programs may be appropriately regional in character, e.g., onchocerciasis in the Volta Basin, while others may be reasonable and appropriate to area development programs within individual countries.

C. Integrated rural health delivery systems as part of, or complementary to, integrated rural development programs. The same criteria apply here as to national health systems (described above) - applied as appropriate to size and location of specific rural development efforts.

D. Health-related aspects of agricultural rural development or education sector programs, i.e., health inputs as integral elements of broader development objectives. Examples are water supplies (for irrigation and human consumption), health/sanitation education, nutrition, and other selected program efforts.

E. Special health efforts related to populations greatly at risk due to drought, famine or other calamity. Such

support can include emergency supply of medicines, vaccines, equipment, logistical support.

F. Family Planning and Use of Title X:

AFR believes child spacing and other family planning services form a natural and essential part of minimum health or MCH services. This should be a basic understanding wherever possible in helping develop national health delivery systems as discussed in 2 above. Title X funds, however, are not available for full assistance costs for integrated health/FP programs. Title X funds are available for:

(1) Contraceptive supplies and advanced FP technical training, as needed, in all family planning programs in Africa.

(2) Support to Pathfinder, IPPF and other organizations with programs in Africa.

(3) Contraceptive supplies, family planning training, and proportional share of overhead cost of integrated health/FP programs where AFR and PHA agree on these as priority efforts in terms of AFR health strategy and PHA's program criteria.

(4) Population programs such as population dynamics, demographic/census work, etc., as approved in PHA programming process.

Missions should also be aware that with current funding levels and priorities in Title X, PHA will be seeking proportional AFR non-Title X funds for some costs of existing health/FP programs previously funded wholly from Title X. A full list of such possibilities is being prepared by PHA for review with AFR.

Missions should therefore plan to propose AFR (non-Title X)] funds for health-related programs that do not have an integral FP element, and for the health and proportional share of overhead costs of integrated health/FP programs. AFR will support these proposals in accordance with its health strategy.

A HEALTH STRATEGY IN AFRICA

The analysis which supports the health assessment's conclusions and technical recommendations clearly underlines the importance of considering the health factor in any economic development strategy to be pursued in Africa. If an increased income level, shared in an equitable way, is one of the major objectives of development, improved health should receive substantial emphasis, not only because it means an improved quality of life for the people but also because of the critical role that health plays as a constraint to economic development of a country's productive resources. Low levels of health adversely affect the economy, inter alia, by diminishing the supply of labor and/or affecting its productivity as well as by limiting the use of other physical resources such as land. We submit that the Bureau adopt as a first element of criteria toward a health sector strategy, the overall objective of increased social equity.

The health problem in Africa, is very complex. It affects vast numbers of people regardless of political boundaries. Both direct and indirect links and effects exist among different diseases, i.e., parasitism and malnutrition. There is, in addition, widespread scarcity of financial and skilled human resources. Health systems in Africa are currently characterized by very skewed patterns of access. Urban populations receive a disproportionate share of available health services, while large rural population groups receive no medical attention whatsoever. The fact that health problems are complex does not necessarily imply a need for complicated mechanisms to meet them, especially given low levels of absorptive capacity in African countries. Nonetheless, because of the interrelated nature of health problems the means of intervention in all probability must be as comprehensive as resources permit.

In the context of this situation and given current emphasis in A.I.D., we should seek to help countries achieve similar levels of health status throughout their society, within a reasonable time frame. It must be acknowledged that acceptance of this goal would significantly determine the geographical orientation of the Bureau's future health efforts in Africa. It would lead our efforts toward the rural areas and away from already better served urban areas. Such rural orientation, to be effective, requires the existence or development of health delivery systems that are both efficient and affordable to the country.

Having decided the goal of assistance in the health sector, a second important consideration relates to the procedures through which funding priorities are decided. The identification of four major areas of programmatic priorities in the analysis, is a function of the overall assessment of health in the African Continent.* The weight received by each one of the areas is specific to each country and/or region and must, therefore, be determined by analysis of each case. As the summary briefly indicates, funding priorities are not merely a function of the degree of importance of a disease or group of diseases but also of the degree to which simple and/or comprehensive interventions will affect both health status and impact on the economy. The need for rigorous analysis as a prerequisite for decision making at the project level is evident. As a pivotal element of its health strategy, the Bureau should expect and indeed require reasonably comprehensive, case specific, health sector analysis in support of programs and projects. These analysis may be, of course, jointly sponsored with other donors and should involve as many host country's technical personnel as possible.

Given the two overall policy guidelines stated above, and based on the findings and recommendations of health assessments in Africa, the Africa Bureau will carry out the following four-prong health strategy during the next several years:

I. The Bureau will support integrated health programs in selected countries for the following overall purposes:

- To obtain maximum impact on both health status, as measured by accepted epidemiological methods, and the effects of disease and/or poor health on economic activity, as defined, inter alia by the quantifiable effects on production and/or productivity.

  In practice, the relative priority assigned to either of these types of impact would have to be consistent with those suggested by host government policies.

* Discussed in following section.

- To gain experience and/or know-how through applied research as to the most efficient manner for planning and delivering health services in the LDCs. Spin-off benefits would result from the transfer of this know-how through health program replication locally, nationally and regionally.

IA. Rationale

In an attempt to maximize cost-benefits in the utilization of scarce health care resources, it is most important to pool health and health-related resources, as well as integration of programs wherever feasible. The implementation of these types of activities will result in both a more comprehensive health service program, and increased accessibility and availability of health care to a greater number of people. The tying-in of health programs to other on-going projects or implementation of the concept of developmental packages, in which health services is a component, could be of immense benefits in a synergistic manner. In addition, special emphasis should be made on the development of minimum health package programs.

IB. Action Strategy

A number of areas have been identified as those deserving highest priority for possible AID funding. They are divided into 2 categories. They are: 1) programmatic activities important for improvement of health in Africa and; 2) health infrastructure changes for improving the chosen programmatic activities.

1. Programmatic Area Priorities

Four areas have been identified for highest priority. They are thought to be similar in importance. These areas are: 1) communicable disease control; 2) nutrition; 3) environmental sanitation and; 4) family planning. Large elements of all four can be combined, perhaps resulting in important program economies.

If desirable, certain components of all four priorities can be incorporated into an integrated health delivery

system package which would include: 1) the delivery of family planning services; 2) the delivery of basic preventive health services; 3) nutrition education and mother, infant and child feeding programs; 4) environmental sanitation.

This same mix of services could be added on to many other health or non-health activities, and could constitute the marginal health package component to other sectoral projects as in agriculture or rural development as discussed later. There are a variety of delivery mechanisms which could be utilized including: a) static units; b) mobile teams and; c) single live-in health workers. The choice should be determined on basis of cost-effectiveness.

The advantages of such an integrated approach are: 1) economics of scale; 2) greater possibilities for changing attitudes toward health; 3) greater possibilities for undertaking timely complementary interventions.

The disadvantages are that: 1) the cost of implementing even a simple integrated system may be beyond rational means to support in large portions of rural areas; 2) demands may be generated on the system which will direct scarce resources from more efficient interventions.

A detailed analysis in support of this strategy is found in the Bureau's document entitled"Health in Africa".

2. Health Infrastructure Priority Areas

There are certain critical infrastructure inadequacies which would serve to jeopardize the implementation of the programmatic area priorities. They are not very

efficient vehicles for short-run changes, however, and are presented here as activities which should normally be considered in concert with changes in programmatic priorities. Therefore, greatest impact will result if these infrastructure changes are supported initially with a focus on priority program areas:

a. Health Administration.

b. Health Planning and Evaluation.

c. Health Information Systems.

d. Health Education.

The major elements are:

- Curriculum development for health courses in formal education.

- Non-formal health education opportunities.

e. Health Manpower Development.

II. The Bureau will move forward vigorously in the development of a mechanism for insuring that due consideration is given to the inter-relationship between health problems and aid efforts in rural development, food production and nutrition, education, and population oriented initiatives. The implication here is that this mechanism will apply to all programs and/or projects participated in or supported by the Agency in African countries.

IIA. Rationale

Some consideration has been given to the significant potential benefits by integrating family planning services with health projects, however, very little attention has been given to the relationships between health and other fields of AID interest. For example, the consequence of irrigation projects in spreading schistosomiasis has usually been ignored. In the same manner, we have seldom considered the role of health education in shaping demands for nutritious food diets in the context of agricultural production, even in those

situations in which the nutritional soundness of the proposed crop mix has been considered. In evaluating the impact of nutrition programs, which is so important for development of national nutritional strategy, clinical testing must be done. Further, to prevent significant food wastage one must deal with problems of infectious and parasitic diseases (i.e., dysentery, helminths, malaria, etc.). It is rather apparent that there are interdependent relationships between health and other sector developmental programs such as family planning, nutrition. Finally, for maximal effectiveness, we must implement a strategy in which program integration becomes bi-directional, i.e., from the health initiative on the one hand, and from the other health related and non-health sector initiatives on the other.

VIII. Action Strategy

In the development of a mechanism for insuring that all health-related and non-health projects and/or programs be considered in light of health implications, certain activities must ensue. These would include such activities as the following:

- Having input from health technical experts in program planning, development, and project design in all health-related and other sector programs.

- In carrying out non-health sector analyses, have input from health personnel as to the potential health implications involved, etc.

- Having input from health technical experts in the formulation of overall policy and setting of priorities.

In carrying out this element of the health strategy, the Bureau is prepared to make available the health personnel resources capability to carry out the following functions:

- Serve as effective liaison with other Bureau's health-related and non-health units.

- Serve on project and/or program review panels of health-related and non-health projects or programs, as appropriate.

- Serve as health representatives with others in the setting up of priorities, particularly in health-related program areas.

- Provide health backstopping and supportive services for the missions and/or field staffs, as appropriate.

At the present time the Bureau is developing a small and closely knit team of health professionals, headed by a senior health professional, to carry out the above functions.

III. The Bureau will make a deliberate and organized effort to achieve an increased level of effective coordination with other health donors in Africa in order to:

- Maximize cost-effectiveness and/or impact of scarce resources (financial and manpower).

- Assure that resources are available from other donors for continued support of successful projects.

- Benefit from the extensive experience and/or expertise of other donors in the health field in Africa.

IIIA. Rationale

In this era of practically overwhelming problems in the LDCs and rather limited resources of all types, it becomes highly important to engage in coordinative and cooperative efforts at all levels for maximum effective use of all resources. Coordination efforts should involve non-US donors, African governments and national health agencies, and international health agencies. Coordinated and cooperative use of this array of resources in Africa could favorably affect health status and quality of life for Africans, and will allow us to: a) maximize impact of scarce funds; b) assure that the budget resources usually supplied by other donors, which might ultimately be needed for the continued funding of successful projects will be available and; c) benefits from the extensive experience that other donors have in the health field in Africa.

In addition to financial and manpower resources existing in foreign donors and international health agencies,

there are significant resources existing in many of the African countries, although some of the health manpower resources are not utilized effectively and others are not utilized at all in the organized delivery of health services. An example of the latter is that of the traditional health practitioners. Although they represent a potential source of health manpower for addressing health delivery problems in many LDCs, this potential is rarely tapped in the planning and delivery of health services by the national health agencies. In many instances they play a significant role in the delivery of health services (i.e., traditional birth attendants), however, there is usually no formal nor planned involvement between this group and national health agencies.

IIIB. Action Strategy

The Bureau will take the initiative in moving forward on this element of the health strategy in such manners as the following:

- Meet with donor countries and agencies, in association with and without recipient countries, to discuss areas for coordinative and cooperative efforts in health in the LDCs.

- Meet with international health agencies and organizations, i.e., World Health Organizations, to explore areas and opportunities for cooperative and coordinative efforts in health activities between the Bureau and the individual international health organization.

- Encourage USAIDs to look for and identify opportunities for coordinative and cooperative ventures between donor countries, international organizations, and voluntary agencies in their particular LDC in Africa.

As a first important step in the implementation of this strategy the Bureau has collaborated and will participate in a conference with donor agencies, international health agencies and recipient countries to be held in the spring of 1975 under the sponsorship of the WHO.

IV. The Bureau will move vigorously forward in making sufficient funds available, within reason and practicality, for support of the majority of worthy health projects developed in the implementation of the Health Strategy for Africa. This activity will include seeking additional appropriations or allocations for health in the event that worthy health projects cannot be supported because of lack of funds, again within practical reasons.

IVA. Action Strategy

In carrying out this element or component of the Health Strategy for Africa, the Bureau will engage in such activities as follows:

- Encourage appropriate personnel at all levels to identify opportunities for development of worthwhile projects in health which fall within the framework of the Bureau's Health Strategy.

- Upon identification of such opportunities for potential health project development, then appropriate technical expertise should be brought to bear for refinement of the idea and/or further development of the projects.

- Provide and make known their existence a cadre of technical experts to provide technical assistance in the planning, development, and design of health projects for Africa.

In conclusion, the four-prong Health Strategy for Africa will allow the Bureau to move forward and intervene actively in the health field, both directly and indirectly, i.e., directly by developing and supporting health projects, and indirectly by tying in health projects to other health-related and non-health projects.

AFR/DS, dGayoso/Cross:jm:ds 11/7/74

PROGRAMMATIC GUIDANCE
FOR AFR IN THE HEALTH SECTOR

The background paper "Health in Africa" points out the seriousness and the complexity of the health situation in Africa. It also points to certain approaches, e.g., preventive health efforts and integrated rural health/family planning services, which are generally considered desirable trends in health development. But these general suggestions cannot provide programmatic guidance for individual Missions because of the wide circumstances of individual country situations, non-health factors (e.g., governmental interest) and budgetary problems which would influence the proposal for a particular program or project. Health sector analyses, as part of the DAP or subsequent planning efforts, should serve to develop these specific country factors.

While such conditions must be analyzed by the individual Missions, this paper seeks to provide guidance to the Missions on those program approaches which, based on experience and estimate of available resources, AFR would be prepared to support. This is particularly relevant because with the renewed emphasis within AID and AFR on the health sector, there is some uncertainty in the Missions as to the priority and degree of program support AFR is now giving to this sector.

I. Types of Program Approaches

A. National Health Delivery Systems.

Most of the recent attention in the health field has been paid to development of low-cost rural health delivery systems. As indicated in the paper on "Health in Africa", such integrated programs have the advantage of:

(a) Providing minimum services to the bulk of the population;
(b) Utilizing para-professional manpower in place of scarce or non-existent doctors in the rural areas;
(c) Providing for delivery of family planning advice and services in an acceptable and cost/effective way;
(d) Emphasizing preventive services.

In seeking to develop such programs, several constraints have been commonly identified: These relate to administration, infrastructure, manpower, education and budgetary matters. Most assistance efforts have focused on one or more of these bottlenecks. For example, the Strengthening of Health Delivery Systems project in West Africa to which AID contributes will provide training for health planners and health trainers, plus direct assistance in health planning, for 20 countries. The AID-assisted Upper Lofa County health project in Liberia will provide advice and assistance for training of para-professional workers, plus family planning and other support for a network of rural health sectors

and health posts. In Ghana, a project in health management and administration, along with a research project on delivery of health and family planning services, are seen as precursors to support for a national health/family planning delivery system. In Tanzania, AID is providing a grant for the construction of regional family planning and family health training centers, as well as commodities, as part of a comprehensive national health program to which other donors are contributing other key elements.

However, there are also more fundamental issues which affect the success of these programs: Adequate government support, finding truly "low-cost" systems -- i.e., systems of even minimal health services that governments could finance, effective means of instilling on-going training and supervisory practices, and of coordinating various professional health interests. With this experience in mind, the following guidance is suggested:

1. Long-term support. Development of any national health delivery system will take many years of sustained effort. AID support will have to be analyzed in terms of such long-term requirements. For this reason, however, AID should not start down the path of helping develop such a system unless there is a core of dedicated host country persons prepared to back and implement these efforts. This means a body of officials who are prepared to support new forms of training, delivery of services and concepts of health care, and who can provide some assurances of continued host government financial support for such an effort at a steadily increasing level (including exploration of private resources, e.g., payment for services in place of free care).

2. Multi-donor support. Becuase the external needs of any national system will be great, and because there are many donors operating in the health field, AID should seek to develop a situation with the host country where donors' inputs are coordinated and committed to the overall plan. This is also valuable because different donors have different strengths and respective interests, e.g., AID is prepared to support and/or fund health manpower/family planning training and commodities, UNICEF vehicles and MCH training, FED hospitals, etc. The strength of the Tanzania program is that these diverse donor interests have been coordinated in support of a Tanzanian integrated approach to rural health.

3. Local "rooting" of health systems. One of the striking and dismaying aspects of the health sector is the plight of systems previously instituted (with outside design and assistance) which have stagnated in subsequent years. The DAP Team in Senegal found the health situation to be deteriorating as standards lapsed, manpower became discouraged and apathetic, and due to the failure of development of the link between popular awareness and the formal health services. In Mali, some health workers not only do not practice what they have been trained to do but even fall into the custom of accepting health conditions in

their own families (kwashiokor) which are preventable. Somehow, systems established on "sound" health principles have failed to take root, to gain popular understanding and support, to provide people who are not only trained in a formal sense but trained to be adaptive, innovative and effective in their home communities. Whatever the causes of this phenomenon -- and there are many -- they suggest greater attention to the indigenous character of the support, understanding and institutionalization of any health inputs from abroad.

When such conditions are met or are coming into being, AID Missions should develop programs of support in collaboration with other donors that have a multi-year focus and which could well include capital (e.g., sector loan) as well as technical support.

Short of these conditions being present or readily foreseeable, Missions need to think through carefully the value of assistance. Health planning and administration advice, manpower development, curriculum reform, etc. may be activities which contribute to the above conditions eventually coming into being and are therefore worthy of support as precursors to a more comprehensive attack on the problem. But, as often as not, they can result in paper plans, unutilized manpower and reinforced dependence upon outside aid. Missions should therefore analyze what impact is likely to occur from such activities and whether they are the ones most likely to contribute to developing the conditions necessary for developing a more effective national system.

Clearly, there are new concepts of health planning and new forms of training which would not repeat the mistakes of the past. Some of these are being developed by AID, e.g., the MEDEX system for training rural health workers that provides status for these workers, strong support from the senior health professionals, shorter training time, pragmatic focus, and within three years an indigenous training system. Advance exploration of these methods with key country leaders might be helpful in determining the degree of interest and likely effect of such selective assistance inputs.

3. Environmental Health and Other Disease Control Programs. Many of the major health programs in the past in Africa, to which the United States has contributed, have been in endemic disease control, e.g., measles - smallpox in West Africa, malaria in Ethiopia, yaws, etc. At present, the IBRD and WHO are leading a multi-donor effort to control onchocerciasis in the region of the Volta basin; AID is contributing to that effort.

While these programs have been largely successful, they are usually only effective if undertaken on a regional basis with multi-donor support. This is because the disease vectors are often transmitted across national boundaries and because the costs are high. They also often have the result that, while the specific disease is brought under control, the delivery systems created by these programs are not supportable afterward by the individual countries, since little attention is paid to health planning, allocation of health resources, and integration

of control programs into the health delivery systems. For example, the mobile teams established for the measles-smallpox campaign now largely sit immobile for lack of donor-supported gasoline, per diem, etc. This does not detract from the absolute value of the original program, but it does mean that such programs cannot automatically be assumed to have other desirable long term health delivery effects. Thus, these factors need to be taken into account in selecting methods of attack on problems of this nature with such massive and concentrated efforts.

C. Pilot Projects. A third form of assistance often supported by AID is the pilot project to test or develop new methods of delivery, financing of services, etc. Pilots can be as small as a village center or as large as a province. The singular characteristics of the pilot project is that it is not yet linked into any clear system for follow-up and expansion to a large system.

There have been a large number of pilot efforts begun in Africa in past years, and this suggests that any proposals for new ones take careful account first of what has already been tested. In Ghana, the Danfa project is testing the effectiveness, cost and other factors associated with delivery of health and family planning services in rural areas. The UC Santa Cruz project in Lesotho, Dahomey and Gambia is testing methods of training and delivery of MCH/FP services at the local level. The DEIDS project proposes to test worldwide methods of providing integrated health delivery systems to larger "pilot" groups (i.e. at least 250,000). WHO, PVOs, and host countries have other pilot efforts underway. For this reason, AFR would be reluctant to support simply additional pilots for testing methods on a fairly small scale.

However, there may be value in AID helping develop within particular countries programs of health delivery for specific areas as an element of a rural development program and as a means of developing the country's skills in planning and implementing locally-relevant health programs. For example, the DAP for Mali will recommend assistance to a health program in the Mopti region where AID also plans to assist in an expanded millet and vegetable program. The proposed health program will aim at preventive measures that are within the reach of the local population (e.g., related to the actual potential for clean water supplies) and at certain curative programs that can have a fairly early impact on the health of the population and possibly financable eventually from local sources (e.g., breaking the cycle of guinea worm infestation). In this case, the Ministry of Production is most anxious to incorporate a health component in its priority rural development efforts as an adjunct to production programs. There may be other cases in Africa where such area-specific programs can both support other development efforts and help develop the country's capacity in the health field.

11. Family Planning and the Availability of Title X Funds

AFR believes that child spacing and other family planning services form a natural and essential part of minimum health or MCH services.

This should be a basic understanding in developing national health delivery systems as discussed in section I. B. above.

In past years, Title X funds have been available for both family planning programs, per se, and to support some integrated health/family planning efforts in Africa (Danfa, UC Santa Cruz, the Botswana program, CUSS). Because of reductions in Title X appropriations, and with increased focus on priority countries worldwide in terms of population pressures, Title X funds will be more restricted in future years. Essentially, Title X funds are still available for:

(a) Family Planning commodities and supplies and advanced technical training, as needed, in all family planning programs in Africa.
(b) Support to Pathfinder, IPPF and other private organizations with programs in Africa.
(c) Family planning commodities, family planning training, and proportional share of overhead cost of integrated health/family planning programs, where AFR and PHA agree on these as priority efforts in terms of AFR's health strategy and PHA's program criteria.
(d) Development of demographic data systems.

This means that Missions should plan to program non-Title X funds for all health-related programs that do not have an integral family planning element and for the health and a proportional share of overhead costs of integrated health/family planning programs.

It means, furthermore, that in proposing programs for integrated health/family planning efforts, Missions should consider the guidance in section I. B. and I. C. above so that in seeking scarce Title X funds, AFR will be concentrating on those instances which have most chance of being successful in the long-term in Africa.

Further, Missions should be aware that with the current circumstances and criteria for Title X, PHA will be seeking proportional AFR non-Title X funds in future years for some continuing costs of programs previously funded wholly under Title X, e.g. CUSS. A full list of such possibilities is being prepared by PHA for review with AFR.

Beyond integrated health and family planning programs, of course, there will continue to be opportunities for population and family planning programs (e.g. demographical work, population dynamics studies, and certain population research studies) not tied directly to health services. These should continue to be viewed, analyzed and proposed for Title X support in light of the Mission's and PHA's analysis of the population problem and the most feasible ways of addressing it.

III. Summary

AFR will encourage and give priority consideration to health programs in Africa that meet the following criteria:

A. National Health Delivery Systems.

1. Long-term technical and capital support for the development of nation-wide preventive and minimum health delivery systems (including

family planning) where there is evidence of host country support, coordinated donor inputs, and rooting of the health system in the national culture and financial system.

2. Selective assistance in health planning, manpower development, health administration where these can be shown to have significant impact on the development of conditions necessary for building a longer-term nation-wide system of preventive health and minimum curative services.

3. Development and utilization of vital events and demographic data systems.

B. Environmental and Other Disease Control Programs.

1. Regional, multi-donor supported programs which are economically and technically feasible, e.g., onchocerciasis control in the Volta basin.

2. Prevention and control where such programs contribute to the soundness and success of development efforts in a specific area, e.g., the environmental studies and programs in the Senegal River area. In fact, such considerations should be part of the consideration for any area development program, particularly where water resources development could lead to the spread of schistosomiasis, malaria, or certain water-borne diseases.

C. Special and Selected Programs

Programs which support government's efforts in area rural development projects and which help develop the host government's capacity to plan and implement locally relevant and supportable health programs. In a similar fashion, special health efforts related to populations at risk due to drought, famine or other calamities will be supported. Support can include such items as emergency supplies of drugs, vaccines and equipment, plus some logistic support.

IV. Criteria for Evaluation of Proposed Projects

The following are a suggested list of question criteria for evaluation of proposed projects.

1. Will the proposed project provide health services to population groups not now being reached with such services?

2. Is the project feasible in terms of host country projected resources -- both in terms of manpower and financial?

3. Is there evidence of host country commitment to project goals and objectives?

(a) In terms of stated national health priorities

(b) In terms of allocation of financial resources

4. Is project likely to have measurable impact on health status of population? On economic status?

5. Does project incorporate areas of AID priority concern -- i.e., nutrition, family planning, rural populations, preventive health services, environmental sanitation and health education?

6. Does the project contribute to the development of management and planning skills within host government infrastructure?

7. Does the project provide for the development of: (a) appropriate manpower to deliver primary health services, and (b) for necessary supervisory skills and services?

8. Is the project based on a systematic analysis of the health sector and is provision made for suitable evaluation and data feedback?

9. Is project emphasis on preventive health services versus curative services?

10. Is design for provision of services appropriate to needs and resources of host country rather than based on traditionally Western methods for delivery of services?

HEALTH IN AFRICA

I. A. HEALTH AS A PROBLEM FROM THE QUALITY OF LIFE, EQUITY, AND ECONOMIC DEVELOPMENT PERSPECTIVE

In April, 1973 the Honorable John A. Hannah, past Administrator of AID, made the following remarks before the Conference on International Health.

> "The basic concern which I have been addressing this afternoon is the well-being of people. Health, nutrition and family planning are only part of the picture. AID is pointing its development assistance toward meeting basic human needs in the developing countries. We are concentrating our program on food production and education and human growth to support efforts that will result in the fruits of economic growth being shared by all levels of society. This can be done in part through providing access for the poor to better services -- in health, in food production and in education. It can also be done in part by providing poor people with what they need to help themselves. Finally, we are placing greater stress on helping the developing countries provide useful employment for the millions of unemployed and underemployed who exist today and for the millions who are entering the work force each year."[1]

Dr. Hannah's statement of AID's objectives provides a useful perspective in which to develop an agency strategy for investing in health in African countries. He does not simply suggest that the objective of AID is to increase economic development, as measured by per capita income, but that it is also to support basic needs of persons living in developing countries.

The United Nations Research Institute for Social Development (UNRISD) has made an effort to determine the principal components of a measure of the quality of life.[2] They have focused on three important welfare components: (1) basic physical needs, (2) basic cultural needs, and (3) higher needs supplied by "surplus income" above that which is necessary to satisfy either of the two. Further subdividing physical

needs, the Institute suggests that health is one of the most important components. Other components include housing and nutrition.

The conceptual framework of quality of life implies that organizations like AID can focus their attention on improving the health status of a population on grounds of improving the "quality of life." In addition, when addressing how the health of a population may be improved, AID can take a multidimensional approach. It not only can focus on the health status of a population by reducing the incidence of certain infectious diseases such as malaria, smallpox, measles and T.B., or by expanding the health service delivery system (both of which may be appropriate); but also by directing resources to other sectors such as nutrition, education, housing, environmental sanitation, and population control which interact to influence the health status of a population.

Besides the interrelationship of improvement in health status with improvements in the quality of life in African countries, investments in health can also serve to more equitably distribute the gains of economic growth. Through the mechanism of governmental taxation and expenditure and redistribution policies, in kind income can be provided to the poor by providing health service. Where low income levels limit demand for medical care, public resources can also be used to increase the accessibility of health services to all groups. Even though the primary justification for providing health and related services in education, nutrition, agriculture and demographic change may be based on equity considerations, society receives important benefits from such investments where the productivity of individuals receiving such services is enhanced as a consequence, and can lead to an increase in total output.

Within the context of economic development, it is useful to consider that a quality of life perspective of the role of health in development has led to the view that economic stagnation in poor countries is partially due to factors such as limited aspiration and a tolerance for the status quo. Within this framework, motivational forces are seen as central to the process of economic development. Action in health areas can be important in the creation of new attitudes and motivation, and can reveal to man that he is in charge, that he has a new power of self.

To use the words of Peter Ruderman:

> Development is becoming humanized. There is more emphasis on people and on the quality of life and less on capital intensive development. For twenty years, development has been the servant of a mathematically derived concept of development. Now there is increasing recognition that the original justification of health work -- services for the people -- is valid today as well. The object now is to maximize the amount of health services per dollar spent rather than maximizing the amount of development per dollar.[3]

In the following sections of the paper, a descriptive analysis is presented of Africa's health status, the resources and programs devoted to improving that status, and the impact of socio-economic development on health. The discussion then focuses on identifying and analyzing alternative ways in which health status can be improved in order to improve the quality of life, social equity and economic development in Africa. The paper concludes with a summarization of principal findings and policy recommendations for donor agencies, particularly AID.

I. B. HEALTH STATUS, RESOURCES, AND PROGRAMS IN AFRICA

An Introduction to the Concept of Health

(The definition of health as derived from the Preamble to the Constitution of the World Health Organization is as follows:)

"Health means more than freedom from disease, freedom from pain, and freedom from untimely death. It means optimum physical, mental and social efficiency and well being." While many people would agree that the World Health Organization's definition of health is admirable, and for certain purposes, is useful, there are problems in using it to determine a population's health status or changes in it. As a consequence, it is generally considered to be an unmanageable definition from a quantitative point of view. We would concur with C. M. Wylie that a more limited definition of health which focuses on changes in mortality and morbidity, or sickness episodes, is a positive first step on developing more adequate indices which would incorporate other qualitative changes in one's health perspective.[1]

One can say that any single improvement in health has no ultimate value in itself but only has instrumental value leading to improved functioning and improved quality of life.[2] As a consequence, the medical/biological systems approach to health problems, or the prescription of one or more health services by a member of the health care team may alleviate disease and illness, but not improve on the "perceived quality of life." If the biological approach is inadequate, it is important to determine how social and cultural factors affect consumer perceptions of health status and illness. In addition to variations in the definition of illness as a result of socio-cultural forces that work in

society. it should be emphasized that illness episodes may lead to degrees of physical or social disruption that differ from one individual to another. As a result, consumption of health services by certain individuals may yield different impacts on the quality of life for the individual and public.

Africa - Its Diversity and Similarities

Africa is a land of contrasts. Its fertile valleys, savannahs, high mountains, vast deserts and equatorial forests are inhabited by 337 million people speaking many different languages and of diverse and often conflicting ethnic, religious and cultural heritage. In fact, the heterogeneity of the African nations seems to negate the very attempt to develop a unified health strategy applicable to Africa as a whole.

Crucial similarities among the African nations do emerge, however: the overall state of economic underdevelopment with its accompanying poverty and malnutrition of the masses; the largely tropical climate of most nations where hot and humid or dry weather is conducive to the breeding of disease vectors; and the increased industrialization and urbanization which have accompanied the development process and brought environmental pollution; and overcrowded living conditions which exacerbate health problems. Thus, while the diverse factors affecting health status vary greatly, not only between but also within African nations, health problems are essentially similar throughout the Region: high morbidity and mortality due mainly to communicable diseases and nutritional deficiencies, coupled with inadequate basic health services and a shortage of medical manpower.[3]

Urbanization in Africa has generally improved environmental sanitation conditions by establishing potable water and sewage disposal systems. Health facilities, market sanitation, food inspection and food handling controls have also been contributing factors to improved health in urban areas. At the same time, however, urbanization has complicated health problems through overcrowding leading to increased exposure of urban residents to communicable disease.

In the rural areas, scattered population groups, often members of nomadic tribes, remain outside the health delivery system. In addition, dietary deficiencies, greater exposure to extremes of temperature and the environment, and limited economic resources serve to exacerbate their health problems.

Health Status as Suggested by Demographic Indicators

The total population of Africa is estimated to be approximately 337 million as of January 1, 1973 and is increasing at an average rate of 2.6 percent per year. These figures imply that the continent's population will double in 27 years. Rapid population increase in Africa is due to reductions in mortality and continued high fertility. The high rate of population growth places a strain on Africa's natural, physical and human resources and thus hampers efforts made to improve the social and economic status.

Mortality and Life Expectancy

Although data on mortality in Africa is generally incomplete due to a lack of comprehensive vital registration, several important characteristics do nevertheless emerge. (See Table I-B.1) First, more than

Table I-B. 1

Mortality and Life Expectancy in Select African Countries

Countries	Infant Mortality per 1000(1)	Child Mortality per 1000(2)	Crude Death Rate per 1000(3)	Life Expectancy (years)(4)
Algeria	86.3	180E	16.9	50.7
Botswana	----	311	22.6	41.0
Burundi	150	364	25.2	36.7
Cameroon	----	311	22.8	41.0
Ethopia	84.2	341	25.0	38.5
Gabon	229	330	25.0	35.0
Ghana	156	223	17.8	46.0
Ivory Coast	138	311	22.7	41.0
Kenya	53.7	242	17.5	47.5
Mali	120	354	26.6	37.2
Morocco	149	185E	16.5	50.5
Nigeria	----	358	24.9	37.0
Senegal	92.9	311	22.8	41.0
Sudan	93.6	242	18.4	47.6
Tanzania	162	248	22.0	41.0
Tunisia	125	170E	16.0	51.7
Uganda	160	324	17.6	47.5
Zaire	104	336	22.7	39.0
Zambia	259	336	20.7	43.5

Sources and Notes: (1,3,4) UN Statistical Yearbook

(2) Estimated from East Model Life Tables found in A. Coale and P. Demeny, Regional Model Life Tables and Stable Populations (Princeton, New Jersey: Princeton University Press, 1966). Assistance of Dr. James Maslowski is acknowledged in determining the most appropriate regional model table to use. See also W. Brass, et. al., The Demography of Tropical Africa (Princeton, New Jersey: Princeton University Press, 1968) for survey data on infant mortality rates in various countries of Africa.

NOTE: Figures followed by "E" denote estimates.

half of all deaths in a given country generally occur in infants less than one year of age; in fact, for the continent as a whole, approximately 150 infant deaths are recorded per 1,000 live births. Second, estimates based on life table analysis of child mortality from several sub-Saharan African countries indicate that approximately one-third of the children born each year will die before they reach the age of five years. Third, crude death rates in Africa, although falling, are still very high, with most countries having rates greater than 25-30 per thousand.

Primarily due to high infant mortality, life expectancy in most African countries is exceptionally low. Examining data from a recent report on Africa, life expectancy in most countries is between 40 and 50 years and is particularly low in two Sahelian countries: Upper Volta, 37; and Mali, 37. Only in four countries in North Africa and Southern Rhodesia is life expectancy 50 years of age or greater: Morocco, 51; Tunisia, 52; and Algeria, 51; Libya, 52; Southern Rhodesia, 51.[4]

Fertility

Fertility is high in Africa. As can be seen in Table I-B.2, crude birth rates generally exceed 40 per thousand, and in some areas of West Africa, the average birth rates are even higher. At the same time in countries like Gabon, Central African Republic and Northern Zaire, the rates are lower than in other areas of the continent.[5] In addition, the Population Council has estimated that an average of 6.1 children are born per African woman during her reproductive life. This is the largest completed family size of any region in the world.[6]

Table I-B.2

Fertility In Selected African Countries

Countries	Crude Birth Rate per 1,000[1]	Total Fertility Rate per Woman 1965-1970[2]
Algeria	49.1	
Botswana	44.2	
Burundi	48.1	
Cameroon	43.1	
Ethopia	45.6	
Gabon	32.5	
Ghana	46.6	6.97
Ivory Coast	46.0	
Kenya	47.8	6.75
Mali	49.8	
Morocco	49.5	
Nigeria	49.6	
Senegal	46.3	
Sudan	48.9	
Tanzania	47.0	
Tunisia	46.3	6.77
Uganda	43.2	
Zaire	44.4	
Zambia	49.8	

Sources and Notes: (1) UN Demographic Yearbook

(2) Population Planning Sector Working Paper. World Bank, Washington, D.C.: March 1972. Data from Tomas Frejka's "Alternatives of World Population Growth", Population Council, New York is only available for the three listed countries in Africa.

In some African countries, there is evidence that, as the theory of demographic transition suggest, in the initial transition period, fertility levels increase due to improvements in maternal health.[7] The important question for African governments and international agencies is how to shorten the period of time before fertility declines occur. Due to the currently high fertility levels, a large proportion of the population in Africa is less than 15 years old (40%) and this young age structure leads to a high dependency ratio. In addition, the continuing high fertility levels lead to rapid increases in the size of the labor force.

Migration

The African people have traditionally been highly mobile. In the past, vast movements of tribal and linguistic groups for religious, trade and political reasons were common. The establishment of colonial administrations in Africa, mainly in the early twentieth century, served as a powerful force in stabilizing the historically fluid population. At the same time, promotion of economic development by extending communications, transportation and production networks across the continent brought new incentives for maintaining a mobile population. Migrant labor became an important way of life for many persons seeking a larger share in the rapidly expanding African economy. In fact, it is estimated that at least five million people are involved in migration labor movements annually in sub-Saharan Africa alone.[8]

The seasonal migration of labor which follows varying harvesting periods from country to country is an important component of the economic

life of many African countries. Large-scale technical projects such as construction of bridges, dams and hydroelectric plants have also temporarily drawn labor from many parts of the continent into a given area. In addition, movements of nomadic pastoralists in search on new vegetation for their cattle are common, especially in the savannah regions of Africa. More importantly, the political, social and economic changes stemming from independence of many African countries in the 1960s have caused large numbers of persons to leave homes for the other countries. (Currently there are approximately one million refugees dispersed throughout the continent.)

Perhaps the most important migration occurring in Africa today is rural-urban migration, which is significant not only from an economic point of view in reallocating labor, but also because of its many health implications. This migration flow has resulted in most African cities growing significantly faster than the total population as noted in Table I-B.3. This rapid urban growth has resulted in creation of numerous slum areas and their concomitant health problems related to poor environmental sanitation, poor nutrition, and mental pressures of unemployment and underemployment. It should be emphasized, however, that Africa is and will remain an essentially rural continent for a considerable period with well over 80% of the total population working and residing in rural areas.

Table I-B.3

Annual Growth Rate of Total Population and Urban Population (1958-62)*

Country	Total Population	Cities 100,000 Inhabitants or More	Towns 20,000 Inhabitants or More
North Africa			
Sudan	2.8	2.4	3.8
UAR	2.6	26.3	32.6
Libya	1.9	15.7	46.4
Tunisia	1.4	10.4	19.9
Algeria	2.1	16.7	44.8
Morocco	3.0	18.9	24.2
West Africa			
Mauritania	5.1	----	----
Senegal		12.1	21.5
Guinea	3.0	3.6	5.2
Sierra Leone	0.5	5.9	7.5
Liberia	1.3	----	8.0
Ivory Coast	2.2	5.6	7.6
Ghana		10.8	12.1
Togo	----	----	6.1
Dahomey	----	----	8.3
Upper Volta	----	----	2.5
Mali	----	3.3	3.8
Niger	3.0	4.5	4.5
Nigeria	1.9	4.0	10.2
Central Africa			
Congo (Kinshasa)	2.4	5.9	9.1
Congo (Brazz.)	1.3	15.8	22.2
Gabon	2.1	----	10.6
Cameroon	1.9	3.0	6.3
Central African Republic	1.9	----	13.1
Chad	1.1	----	6.4
East Africa			
Rwanda	2.6	----	----
Burundi	4.9	----	1.9
Zambia	2.8	5.8	16.1
Malawi	2.1	----	0.6
Rhodesia	3.3	12.0	16.3
Tanzania	1.9	1.4	2.7

Table I-B.3 (cont'd.)

Annual Growth Rate of Total Population and Urban Population (1958-62)*

Country	Total Population	Cities 100,000 Inhabitants or More	Towns 20,000 Inhabitants or More
East Africa			
Kenya	2.9	5.2	6.1
Uganda	2.5	——	2.1
Somalia	2.8	——	4.5
Ethopia	1.6	2.8	3.9
Madagascar	2.8	4.4	7.8

* Figures taken from Housing in Africa, September 1965 (E/ON.14/HOU/7, rev. 1, United Nations, New York), table 1, Annex I, p. 180.

Source: ILO, Employment Policy in Africa, Part 1: Problems and Policies, ILO Document for the Third African Regional Conference, Accra, December 1969 (Geneva: ILO, 1969).

Health Status:· The Major Disease Problems

The African people are infected by a vast range of diseases and the majority have at least two major diseases. Thus, throughout the continent sickness is the norm. In a profile of the major health problems of the African nations developed from a WHO questionnaire responded to by 28 countries, malaria was overwhelmingly the principal concern noted (listed as top priority in 19 of the 28 responses), followed by tuberculosis, leprosy, helminthiasis (worms), schistosomiasis and diarrhea and dysentery. While this profile reflects health conditions in the African nations one decade ago, this group of diseases is still the major health problem of the region (see Table I-B.4.)

The following summary of the major diseases focuses on their incidence, regional differences, age and sex specific characteristics, means of transmission, major economic impact and the methods of treatment and/or control currently in use.

Malaria

Malaria is the most serious health problem in Africa from a socio-economic standpoint. According to the 1969 report by the Director-General of WHO, malaria affects more than half of the African children under three years of age and virtually the whole population over that age can be directly implicated in 10 percent of the deaths of children under 5 years of age.[10] Considering the adverse effect of the disease on the workforce, the recent finding of a higher prevalence of malaria among wage-earners than previously estimated

Table I-3.4

Major health concerns	Africa 28	Western Pacific 27	Southeast Asia 7	Americas and Caribbean 34	Eastern Mediterranean 14	Europe 30	Australia New Zealand Japan 3	Canada United States 2
Malaria	● 19	○ 8	○ 3	○ 10	● 8		○ 1	
Tuberculosis	○ 17	● 24	○ 3		● 10	○ 11		
Leprosy	○ 9	○ 11	○ 3					
Helminthiasis	○ 9							
Bilharziasis	○ 9							
Diarrhea and dysentery	○ 9	○ 9	● 7	● 13	○ 7			
Filariasis		○ 8	○ 3					
Deficiencies in organization and administration	○ 6		○ 1	○ 3	○ 7	● 12		○ 1
Trypanosomiasis	○ 6							
Onchocerciasis	○ 5							
Venereal disease	○ 6	○ 12		● 13		● 9	○ 1	○ 2
Malnutrition	○ 6	○ 6	○ 3	● 16	○ 3			
Environmental, deficiencies	○ 5	○ 11	● 7	● 13		○ 11	○ 3	
Smallpox	○ 3		○ 2					
Cholera (including El Tor)		○ 6	○ 2					
Meningitis	○ 1-2							
Yaws	○ 1-2							
Enteric fevers	○ 1-2							
Trachoma	○ 1-2		○ 2		○ 6		○ 1	
Infectious hepatitis	○ 1-2					○ 11		○ 1
Accidents	○ 1-2					○ 6	● 3	● 2
Respiratory virus diseases		○ 3				○ 11		
Population pressure		○ 5	○ 3					
Cancer			○ 2		○ 3	● 9	● 3	● 2
Chronic degenerative disease				○ 4	○ 3	● 9	● 3	● 2
Alcoholism				○ 4			○ 1	
Movement of people					○ 5			
Urban congestion					○ 1			
Vascular disease of central nervous system							○ 1	
Mental disorders				○ 4		○ 6	○ 3	○ 1
Narcotics							○ 1	
Dental health		○ 4					○ 1	○ 2
Indigenous populations							○ 2	
Aged and chronically ill								○ 1
School health								○ 1
Handicapped								○ 1
Manpower								○ 1

Figure 3. Regional profiles of health problems. Developed from a questionnaire reported by the World Health Organization in *Third Report on the World Health Situation, 1961–1964*, no. 155 (Geneva, 1967), pp. 28–35. Some data were taken from a prepublication mimeographed document of the same title. The figure at the top of each column indicates the number of countries reporting. Circles and figures in columns indicate the number of countries listing the particular health problem as a major concern; a black circle indicates regional consensus that the problem was one of the most important. The vertical line arbitrarily separates less developed from more developed regions. The horizontal line separates diseases of greatest concern to less developed regions from those of greatest concern to more developed regions.

becomes even more serious. In the endemic areas of tropical Africa, losses of from twenty to forty working days a year per person are not uncommon.

In most of the African countries the problem is compounded by the fact that malaria eradication in the strictest sense of the word is not feasible because of financial, administrative and technical limitations. As a result malaria control efforts to date have been concentrated on surveys and field research projects. In the absence of adequate health infrastructures and most importantly a network of peripheral health services, African nations have been unable to effect necessary surveillance and health education crucial to the elimination of the disease. WHO has come to the conclusion that malaria eradication programs will have to be adapted to the individual nations' resource availability, health service organization and local epidemiological factors.

Smallpox

Although notification is obligatory, no accurate statistics on the overall incidence of smallpox in Africa is available. Surveys conducted by WHO in 1967 suggested that worldwide less than 5 percent of all smallpox cases were being reported. In 1971, WHO estimated the incidence to be over 50,000 cases.[11] In recent years, however, smallpox has been largely brought under control. Perhaps the most impressive data in illustrating the effectiveness of the eradication program is that smallpox has been declared eradicated from all but two African countries -- Ethiopia and Sudan. In contrast in

the beginning of the last decade (1960), "10 countries in the region were reporting annual incidences of between 1,000 and 5,000 cases each and ... one case in five was fatal."[12]

Overall prospects for complete eradication of smallpox in Africa are good because of the facility of providing permanent protection through a simple vaccination. Further, while some earlier problems were caused by the instability of vaccines at the average high temperatures characteristic in Africa, the development of freeze-dried vaccine which is currently being produced in several African countries has virtually ensured immunity upon being vaccinated.

Measles

Measles is one of the principal causes of death in African children.

Until the development of measles vaccine, the disease was only scantily reported. More recent figures based on immunization campaigns, while still incomplete, indicate that measles is common throughout the Region.

The disease is especially fatal when infection occurs among already malnourished and parasitized children, notably in the rural areas. In addition, measles tends to be more lethal in tropical than temperate climates because of the early age at which children in the tropics are infected. It often acts in a synergistic way in children in various stages of malnourishment to further increase mortality among young children.

Tuberculosis

Tuberculosis has a high prevalence throughout Africa which can be correlated partially to population movements and the current urbanization process. While the exact incidence for the continent as a whole is not known, data on incidence in East Africa in the late 1960s are illustrative of the extensiveness of the problem. "The number of people infected amounts to half a million every year; the disease develops in 60,000, the diagnosis is made in 20,000, but the successful treatment is given to 10,000."[13]

There has been increased emphasis in recent years in determining the economic value of preventing TB.[14] Given that the estimated cost of 20,000 doses of BCG vaccine is approximately equal to the cost for a single TB patient requiring 10 months of hospitalization and several years of outpatient service, the relative value of protecting 20,000 persons against TB is obvious.

Onchocerciasis

Onchocerciasis affects an estimated one million Africans. While the disease has been found in the mountain regions of East Africa and in certain parts of the Congo forest, its most severe effects are in the savannahs of the Volta River basin in West Africa where approximately 70,000 adults out of a population of 10 million suffer "economic blindness." This parasitic disease is transmitted from person to person by the bites of female black-flies of the simulium species. Since they must breed in areas near running water, it is also known as "river blindness."

Onchocerciasis is not generally a fatal disease and infected persons may live for decades. The ill effects of the infection are cumulative and are due mainly to the host's reaction to dead larvae. Over time, the larvae destroy the elastic layer of the skin, thus giving an appearance of premature old age or elephant skin. In extensively infected persons, itching has been known to be so severe as to lead to suicide. In its more advance stages, larvae may also penetrate the anterior chamber of the eye and ultimately result in blindness.

In areas in which the disease is prevalent, almost all of the population are carriers of the parasite without being seriously incapacitated by it. In the hyperendemic areas, however, the majority of the inhabitants will suffer some sort of eye problem. Blindness in more than 10 percent of the total population and 20 percent or more of the adult males is common, and life expectancy is generally lowered.

Since the most crippling effects of the disease occur in adulthood, the socio-economic effects of these high infection rates on African villages are most serious. Affected families are more poverty-stricken than others, due to the adult members' inability to farm effectively, and affected villages are much poorer than those that remain free of the disease.[15] In addition, as populations resettle in upland areas to avoid this fly vector, agricultural productivity and thus economic well-being of individuals declines; at the same time, overcrowding provides ideal conditions for transmission of other diseases throughout the population.

Even though there are drugs available for curative treatment of onchocerciasis, the most cost-effective long-term control is control of the vector through use of insecticides. Such control efforts have completely eliminated simulium flies from Kenya, and the vector is under control is parts of Ivory Coast, Mali and Upper Volta. An extensive 20-year campaign, beginning in 1974 in the endemic Volta River Basin to be coordinated by the World Bank, is viewed as the first important step in eliminating this disease from the continent and increasing the fertile river bottom land available for alleviating the food deficit in the West African region.

Trypanosomiasis

Trypanosomiasis, or sleeping sickness as it is more commonly known, is transmitted by the tsetse fly and has historically been endemic to West, Central, and East Africa. In the area around Lake Victoria a severe out-break between 1902 and 1905 killed about half the total population. Present prevalence varies from country to country and total incidence is not known, although the disease has been reported in 30 of the 58 African countries. It is estimated in Zaire, there may be as many as 250,000 people infected. For the continent as a whole, average annual mortality rates are estimated to be about 5 per 100,000 population.

The continuing migrations of African people, some of whom may be infected with the disease, coupled with reinfestation of previously cleared land areas by the tsetse fly, increase the possibility of larger outbreaks and thus pose a potentially serious health hazard.

In addition, the disease is a severe problem in cattle, which provide a large reservoir for the trypanosome parasite. The widespread presence of trypanosomiasis in cattle has prevented many Africans from expanding the use of cattle as a source of food or for agricultural production and other economic activities.

Schistosomiasis

"Man is more heavily parasitized in the African continent than in any other part of the world... There are on the average two (such) infections per man. Schistosomiasis is the dominant form, affecting nearly half the population.[16] In an early 1960 report of 28 African countries to the World Health Organization, approximately one-third reported schistosomiasis (bilharziasis) as a major public health concern.

The control of the disease in African nations is complicated not only by the fact that the very economic measure essential to the development process itself, the expansion of irrigation intensive agriculture through construction of dams and canals, provides an ideal vehicle for spread of the disease larvae which are transmitted by certain species of snails but also by the fact that to date no generally applicable treatment has been found. Drugs currently available to treat the disease often produce serious side effects and cannot be used on the massive scale necessary to bring the disease under control. With increasing numbers of investments in irrigation projects in agriculture, the disease is spreading throughout the continent.

Schistosomiasis is extremely debilitating and sometimes fatal. In the case of one variety, for example, s. japonicum, the National Academy of Sciences in its survey -- Tropical Health -- estimates that the working ability of infected persons is reduced from 15-18 percent in mild cases to 72-80 percent in its more severe forms.[17]

Diarrhea and Dysentery

While virtually every one in Africa periodically suffers from diarrhea of varying degrees of severity, the problem is particularly acute among young children during the weaning period. Diarrhea is largely caused by impure drinking water, insufficient amounts of water for minimal cleanliness, and unsanitary disposal of human waste. Thus, the institution of environmental sanitation and related health education programs is of major importance in alleviating this health problem. Diarrhea can, by itself, lead to problems of dehydration and malnutrition, and the same time through its synergistic effects, exacerbate other illnesses. Diarrhea is an especially serious problem among young children who often are at least slightly malnourished, are exposed to other major disease problems, such as measles and malaria; and at the same time are least able to avoid contact with unsanitary environmental conditions.

Throughout Africa there are a number of specific diseases which present major health problems. While discussion centered around the major diseases, other important infectious and parasitic diseases in Africa include cerebrospinal meningitis, yellow fever, veneral disease, leprosy, and cholera. Looking at the broad spectrum of disease on the

continent, it is clear that improvement in the health status of Africa is still in its infancy.[18]

Health Status and Nutrition

Food consumption is the primary factor affecting the nutritional status of the African population. Existing information suggests that four items are of particular importance as they relate to health status: (1) per capita caloric intake per day, (2) per capita protein intake per day, (3) the distribution of caloric and protein intake per day between age and sex groups, and (4) the seasonal pattern of food consumption, in terms of caloric and protein intake, during the course of a year. Table I-B.5 provides information on the first two indicators of food consumption. It is clear that many people in Africa consume an insufficient quantity of food, particularly when one considers the fact that the figures shown are averages. In addition, it is important to recognize the fact that the data in Table I-B.5 refers to available per capita consumption. Actual consumption is considerably below that available due to losses incurred in storage, transportation, preparation, and to a certain extent, to cultural taboos.

Although data are generally lacking with respect to the distribution of food consumption between groups and over time, such distributional problems often are the source of many of the nutritional and related health problems found in mothers and children. It is useful, therefore, to analyze the limited data available. In Table I-B.6, data are presented that show the wide variation in food consumption

TABLE I-B.5

AVAILABLE NUTRITIONAL INTAKE IN AFRICA, 1965 (PER CAPITA, PER DAY)

	North Africa	West Africa	Central Africa	East Africa	Africa
Total Calories	2051	2174	2064	2190	2154
% of Requirements	85	93	91	94	92
Protein Grams	57.9	58.8	43.1	63.6	58.2
% of Requirements	114	142	115	157	140
Fat Grams	38.2	39.7	36.1	39.9	37.4
Animal Calories	147	87	102	160	121
Protein Grams	9.1	7.5	10.1	11.0	9.3
Fat Grams	10.1	5.2	5.9	11.1	8.0

Source: F.A.O., Agricultural Commodity Projections, 1970-1980 Vol. 2, (F.A.O.: Rome, 1971)

Table I-B.6: AVERAGE ACTUAL CONSUMPTION OF NUTRIENTS IN SELECTED DISTRICTS IN UGANDA, 1968,(PER CAPITA, PER DAY)

Nutrients	Area of Country West	Buganda	East	North
Calories	2256	2019	1347	2988
Protein (grams)	58.0	45.0	32.9	70.9
Animal Protein (grams)	7.0	8.2	5.4	18.5
Fat (grams)	20.7	17.9	22.1	39.5
Carbohydrates (grams)	442	410	243	583

Source: Table A.6, p. 30 and Table 4, p. 17, The Republic of Uganda, Rural Food Consumption Survey, 1963. Statistics Division, Ministry of Planning and Economic Development, (Entebbe, Uganda: Statistics Division, Ministry of Planning and Economic Development, June 1970).

between geographical regions of one country, e.g., Uganda. Although the Western and Bugandan areas consume approximately the African average, as shown in Table I-B.5, the Eastern area is significantly lower than the average, with the opposite being the case in the North. In addition, there is considerable variation in food consumption in the northern part of Uganda between regions and ethnic groups.

Table I-B.7 also shows a large variation in food consumption between men and women and children. Whereas men generally consume approximately the average required caloric intake, women and children consume around 50% of the requirements. It is not difficult to understand from this information why many childhood related diseases in Africa are exacerbated by malnutrition problems which the young child has contracted due to poor weaning habits and insufficient food consumption subsequent to weaning. In addition, many subclinical cases of malnutrition become more severe as a consequence of any acute illness such as diarrhea or malaria.

With respect to seasonal malnutrition problems, the data shown in Table I-B.8 clearly indicate the scope of this problem which occurs primarily just prior to the harvesting of the main food crop. The problem of seasonal malnutrition is particularly acute in the Savannah regions of Africa where monsoon rains are critical to agriculture production. When the expected monsoon rains do not fall for more then one season, these regions become famine areas as is presently the case in the Sahel.

Table I-B.7: AVERAGE CALORIC INTAKE IN THREE ZAMBIAN VILLAGES SHOWING INTAKE DIFFERENCES BETWEEN MEN AND WOMEN AND CHILDREN

	Village A	Village B	Village C
Men			
Average Caloric Requirement	3030	3202	3025
Average Caloric Intake	3506	3542	2709
Intake as % of Requirement	116	111	90
Women and Children			
Average Caloric Requirement	2205	2020	2131
Average Caloric Intake	1160	1300	1012
Intake as % of Requirement	55	65	48

Source: p. 216, Jacques May and Donna McLellan, The Ecology of Malnutrition in Eastern and Western Africa, (New York: Hafner Publishing Co., 1970).

Table I.B.8.

Variations in Food Intake Among the Uboma In Two Contrasting Seasons

	May (Hungry)	Dec. (Harvest)
Calorie Intake of Adults (per head per day)	2,040	2,780
Calorie Intake Percentage Requirement of 2,371 calories/head/day	86	117
Weight-Age Relationship Correlation Co-efficient	+0.12	+0.24
Gram Intake of Foods*		
Meat (0.01)	2	198
Palm Wine and Beer (0.18)	168	960
Yams (0.29)	134	464
Rice: grain (0.39)	28	72
Leafy vegetables (0.67)	31	46
Dry beans and seeds (0.82)	22	27
Dry fish (0.87)	32	37
Cowpeas: akara balls (1.00)	2	2
Red palm oil (1.16)	43	37
Cassava: fermented (1.34)	940	700
Cocoyams (1.38)	142	103

* Daily amounts calculated for periods of April - May, 1964 and November - December, 1963 with ratio of hungry season intake to harvest levels. Tables XVIII and XIX in H.A. Oluwasanmi et al., "Diet, Food Economics and Health," Uboma: A Socio-Economic and Nutritional Survey of a Rural Community in Western Nigeria, Occasional Paper of the World Land Use Survey No. 6 (Bude, England, 1966).

Health Resources and Programs in Africa

Health Expenditures

In virtually all African countries, the private and public sectors spend less than 4% of Gross Domestic Product on health. The data presented in Table I-B.9, however, illustrate that there is wide variation in the ratios of private and public expenditures across countries. The proportion of GDP spent on health in these countries corroborates the observation that the proportion spent on health is lowest where the need is greatest.

There are virtually no private health insurance systems in operation in Africa. In contrast to many of the developing countries in Latin America and India, African governments generally do not sponsor health insurance systems.

In many African countries, per capita government expenditures on health are approximately $1.50. This fact points to a severe budget constraint for health services development in Africa. Given this constraint, if nations in Africa are going to be able to expand their health programs in the short run, foreign assistance must play an important role.

As Abel-Smith points out, the decisions on how much of a developing country's budget should be allocated to health are generally predicated at least in part on political considerations. Political decisions with respect to scarce resource allocations are determined, to some extent, by manifestations of effective demand. Since most people in Africa do not demonstrate their demand for health until

Table I-B.9: Expenditures on Health Services in Selected African Countries Around 1970

Country	Year	% of GDP Expenditures by Sector		
		Gov't.	Private	Total
Central African Republic	1970	1.2		
Egypt	1969	1.1	2.3(1)	3.4
Ethopia	1969	0.7		
Ghana	1970	1.3	2.3(1)	3.6
Kenya	1970	1.4	1.0	2.4
Malawi	1970	2.8	1.2	4.0
Nigeria	1969	0.7	2.8(1)	3.5
Somalia	1969	1.8		
Swaziland	1968	1.2	0.8	2.0
Togo	1970	1.0		
Uganda	1971	1.5	1.1	2.6
Tanzania	1971	1.6	0.9	2.5
Zaire	1970	0.4	1.8(1)	2.2
Zambia	1969	1.8	1.9	3.7

Notes (1) assume private consumption on health is 3.5% of total private consumption. This figure is at the upper end of the range on LDCs for which data are available. Range is 0.6-4.0%. Assumption is made based on qualitative information on the health services provided by government.

Sources: WHO, Statistical Report, 24(1971), pp. 236-245.
UN, Statistical Yearbook 1972, (New York: UN, 1973), tables 180, 188 and 196
Benton Massell and Judith Heyer, "Household Expenditure in Nairobi: A Statistical Analysis of Consumer Behavior," Economic Development and Cultural Change.

they are sick, it is not difficult to understand the natural predisposition for African countries to spend a large proportion of thier available health budget on curative health services.

Finally, it should be pointed out that the expenditure figures presented in Table I-B.9 do not include expenditures made by many African people for traditional medicines or the services of indigenous health providers. There is considerable interest in many African countries as to the importance of the traditional health sector and what policies, if any, the government can or should take. The accumulation of basic information about the traditional sector should be encouraged.

Health Manpower

The shortage of trained medical personnel is and will remain in the near future the major factor in slowing down the expansion of health care services available to the African populace (see Table I-B.10.) Physicians are particularly in short supply. According to data from the WHO's Regional Office for Africa, for most African countries there is barely one physician per 50,000 population even including medical officers provided under foreign assistance agreements. Of the nations reporting health personnel levels to WHO in 1973, for instance, the greatest number of people per physician was 85,000 in Malawi, while the smallest ratios of population per physicians were in Spanish Sahara -- 940:1 and in Egypt -- 1820:1. Caution must be used in making cross-national comparisons of population per physician ratios, however, because examining only the number of

Table I-B.10

Some Health Resources Indicators in Select African Countries

Countries	Population per physician	Population per hospital bed
Botswana	16,000	
Cameroon	26,000	310
Dahomey	30,000	
Ethiopia	------	3,030
Ghana	12,000	780
Ivory Coast	16,000	690
Kenya	7,830	770
Malawi	85,000	640
Mali	41,000	1,390
Mauritania	17,000	2,790
Nigeria	20,000	1,850
Rwanda	55,000	770
Sudan	14,000	1,040
Tanzania	22,000	780
Uganda	9,210	600
Zaire	30,000	320

NOTE: Data which represent the 1970-1971 period are not comparable because of lack of standardization between countries.

Source: World Health Organization, World Health Statistics Report, 26, 3, 1973.

physicians does not look at the more important interrelationship between physicians and other factors such as resources, type of health care delivery system, and the level and type of education of other health personnel -- all of which influence the quantity and quality of care a given number of physicians can provide.

While these ratios do provide some measure of the supply of medical personnel, they fail to address important issues of distribution and quality. Although most countries do not have adequate data on the geographic location of medical personnel, the vast majority of trained personnel are concentrated in urban centers. "In Kenya in 1963 for instance, while there were 10,000 persons per doctor for the nation as a whole, the actual distribution varied from 672 in Nairobi, the capital, to 20,000 persons per doctor in the area outside Nairobi. Further, in the truly rural areas in which 93 percent of the total population live, there were 50,000 people per physician."[20] Furthermore, even if personnel do exist in adequate numbers to serve the local population's health needs, the scarcity of medical supplies and equipment limit the quantity and quality of services provided.

In the short term the shortage of professionally trained medical personnel and unfavorable prospects for increasing the number of physicians in sufficient amount to offset population growth require more concentrated efforts in development of sub-professional, paramedical health personnel. In addition, "integration of existing manpower resources in a polyvalent scheme (is) essential."[21]

Since the health delivery systems in each country generally reflect the specific types, numbers and qualifications for paraprofessional health manpower, it is difficult to make specific inter-country comparisons of the availability of certain manpower categories. However, with the possible exception of Nigeria, it is clear that there is a shortage of physician/medical assistant personnel in Africa to run the rural clinics and health centers. (In Nigeria, such a core of personnel will be extremely difficult to develop due to consumer resistance to "second class doctors" in conjunction with the lack of support from the Nigerian Medical Association.) In addition, although the numbers of "enrolled level" nurses and midwives are increasing throughout Africa, the regional norm is one nurse per 12,000 population. Furthermore, because of the high turnover rate in these occupations, continual efforts must be undertaken to expand their supply.[22] (For further statistical information available on the supply of specific manpower categories in African countries, see Appendix 1.)

Health Manpower Training

Much of the shortage of professional medical personnel can be directly attributed to the lack of medical education facilities on the continent. In 1959 there were only two medical schools in sub-Saharian Africa excluding South Africa (Ibadan and Makerere), each producing no more than 30 doctors per year. In the absence of medical schools, most young physicians were forced to receive training in foreign nations, particularly France and Great Britain. Since the

sponsoring national government traditionally has had no control over the nature of this foreign training, African medical students commonly chose specialties which were of no practical value in dealing with the unique health problems of the dispersed rural populations of their homelands. However, since 1970, many of the African countries have developed at least one medical school; in some of the larger African countries several medical schools are operating: Algeria (3), Egypt (7), Nigeria (5), South Africa (6), Zaire (3). Despite its large number of inhabitants, the Sahel region, with the exception of Senegal, has no medical schools.

The ability of existing medical schools to train sufficient levels of doctors is limited by several factors, one of the most important is the general lack of qualified indigenous teaching and research staff. In addition most African medical schools have tended to be oriented toward curative medical services. Such important areas of study as preventive health, epidemiology and pediatrics attract few medical students. Also there are few courses in organization and administration of health services -- a critical gap given the currently disorganized and inefficient operations of many health facilities. Finally, most African medical schools are modeled on "western" institutions, which means that they are very costly. There are very low student-teacher ratios and the cost per student per year is nearly as high in Africa as in the more developed Western countries.[23]

A manpower resource usually overlooked in Africa is the traditional healer. Little study has been done to determine how this

resource can be utilized. Certainly in the area of mental health, the traditional healer in all probability, plays a more important role than the western trained psychiatrist. This is especially true in rural areas inasmuch as modern psychotherapy is not available. Even if it were, the rural individual would be more likely to seek treatment from a traditional source because of his/her perceptions of causality of the problem.

Apparently some success has been obtained in other parts of the world in recognizing the value of parallel systems -- i.e., both the modern health delivery system and the traditional. Some recognition of this has occurred in Ghana where various types of "native doctors" were licensed between 1951 and 1960.

With respect to paraprofessional training programs, there are a number of interesting experimemts presently underway in Africa. Perhaps the most notable are those run by WHO in Lagos, Nigeria and Lome, Togo, where paraprofessional personnel are being upgraded to develop some managerial capabilities, particularly in personnel and team development. A number of countries are also expanding their own paraprofessional training programs, particularly for nursing and midwifery and medical assistants.

While the cost of such training programs are generally considerably lower than for the training of doctors, some of the most difficult problems which must be surmounted are the generally poor curriculum and pedagogical methods used. As a consequence, the training of teachers is presently being reviewed in some African countries (Ethiopia - Gondar -- and East Africa generally.)

Health Facilities and Delivery Systems

Although data on health facilities are not widely available or classified in a comparable fashion, the principal health facilities of African countries consist of a limited number of stationary establishments. As in the case of health manpower, the distribution of hospitals by geographic location is generally highly skewed toward the large urban centers. There are, however, notable exceptions to this pattern. In Cameroon, for instance, 60 of the 80 hospitals are in rural areas while in Mauritania 5 of the 6 hospital establishments reported in 1971 were rural facilities. In addition, in Mauritius, Tunisia and Zaire more than half the hospitals are located in rural areas.

The number of people per hospital bed varies considerably from country to country as noted in Table I-B.10. In general, the ratios of population per bed are consistently lower in the larger, more developed African countries such as Kenya, Egypt; in contrast, Ethiopia had the highest ratio of people per hospital bed -- 3,030.

Although African governments provide the principal health care services to the African populace, religious groups, industrial companies, voluntary agencies and private individuals play an important complementary role in the provision of health care. As in the public sector, however, such services tend to cluster in the rapidly growing urban centers of the Region. Further, because of inadequate public transportation systems, existing hospitals, health centers and health posts are only accessible to persons within a limited radius of the

facility, and, even within this small population group, actual utilization of health services is low. As a result, the rural resident who represents the vast majority of the African populace, has remained largely outside national health care delivery systems. At the same time, virtually all health establishments are intensively used and it is generally conceded that if travel to such facilities were easier and service more rapid, the demand would be even greater.

Throughout the newly independent African nations, "the development of peripheral health services within the existing manpower resources is now recognized as the most urgent problem facing the new health administrations."[24] Within this context the expansion and improvement of health services available to rural residents is a major health concern. In Uganda, for example, the national health plan has called for an increase not only in the total number of facilities but more importantly, in the equality of access by developing at least one medical facility open daily to serve each of the 620 subcounties in the country.

Finally, the World Health Organization has provided technical assistance to many countries for the establishment of organized networks of peripheral health units. In French-speaking African countries, OCCGE is also assisting in the reorganization of rural health services based on development of polyclinics supported by mobile units' work, especially in control of endemic diseases. Traditionally the requirements for funds for constructing or repairing existing medical facilities has hampered the introduction of even more innovative approaches to health care. Presumably with additional external

assistance, such innovative approaches can be implemented and given careful study for their potential as cost-effective alternatives to present systems.[25]

Population Control Programs

There has been increased public and governmental interest in population control in Africa over the last decade, and at least eight African countries have adopted official family planning policies and/or programs: Egypt, 1965; Nigeria, 1969; Morocco, 1965; Kenya, 1966; Botswana, 1971; Ghana, 1969; Mauritius, 1965; and Tunisia, 1964.[26] At least four of these nations have set specific targets for lowering birthrates in the 1970s: Egypt, Mauritius, Morocco and Tunisia. In addition, the following African countries officially support private efforts but have no formal family planning policy: South Africa, Tanzania, Dahomey, Gambia, Rhoedsia, Senegal.

Despite national efforts in this area, the number of acceptors in family planning programs as a percentage of women "at risk", that is, of reproductive age, is very low in most African countries: Kenya, 2%; Ghana, 1-2%; and Morocco, 3%. In Tunisia, where the program has been in effect since 1964 and a significant operational infrastructure has been achieved, the acceptance rate is considerably higher -- 12 percent -- but fertility rates have not declined as yet.[27]

Several constraints to adoption of more extensive family planning programs exist within Africa. First, there is fear that reduced population may jeopardize military strength and that ethnic balances within the nations may be upset and lead to civil turmoil. Second,

cultural and religious objections to family planning are widespread. Third, there is a lack of adequate administrative skills, medical manpower and facilities which inherently limit extension of family planning programs, especially in rural populations. Fourth, there is a technological problem in that the most safe and effective birth control methods -- pill and IUDs -- are considered to require medical surveillance in many countries. In view of the general shortage of medical personnel, this requirements also hampers extension of family planning programs. Despite these significant problems, however, it is incumbent to improve and share with African decision makers knowledge of the demographic situation in Africa, of the most effective ways to deliver services and of the means to persuade people that it is in their self-interest to use family planning services.

Environmental Sanitation

The lack of potable water and waste disposal systems are major problems throughout the African continent and far outweigh its other environmental health problems such as housing, food sanitation, vector control and industrial pollution. In fact, the vastness of water and sewerage problems, coupled with the limited resources available to most African countries to ameliorate them, will require that they remain the key focus of environmental sanitation problems in the near future.

The provision of community water and sanitation systems to date have been complicated by a general failure to identify needs and determine objectives before project implementation. Projects have tended to be conducted on piecemeal, uncoordinated, micro-design basis in response to emergency situations arising from rapid urban expansion rather than as an integral part of overall socio-economic development plans. In addition, rural areas in which the vast portion of the African population live, have been largely neglected.

The acute shortage of trained and experienced environmental sanitation personnel to plan, implement, and operate programs has also hampered extension of water and sewerage systems. Furthermore, the lack of supportive sanitation personnel including health inspectors and technicians has resulted in highly qualified personnel, when available, being utilized in sub-professional tasks. In an attempt to alleviate this situation, regional centers for training middle-grade and auxillary staff are being planned.

To date little research has been undertaken into the types of network designs most adaptable to African conditions. Rather, countries have tended to follow systems and techniques used in more advanced nations. There is great need, therefore, for research to identify inexpensive and easily operated techniques and systems for water treatment and distribution. The administrative and technical constraints on extending water and sewerage facilities to all Africa are great. Thus, while the final objective must be to supply everyone with an adequate quantity of safe, piped water, in most places it will be necessary to pursue the less ambitious goal of installing water points within easy access of all dwellings from distribution networks adapted to local techniques and financial resources. Until even this first step is achieved, the World Health Organization Regional Office for Africa's target of providing safe drinking water to at least 70 percent of the urban and 40 percent of the rural population by 1975 remains far from being attained.[28]

Need for Demographic Data

While the preceeding sections have attempted to outline the major health problems as well as the resources available and programs currently undertaken to ameliorate the poor health status of the African populace, the assessment process has continually been hampered by the lack of accurate and timely health-related information.

> Whether one is dealing with disease in urban or rural areas of Africa, the outstanding obstacle to a rational approach to disease control is the complete lack of valid statistical data relating to African population, and describing its distribution, birth rate, death rates and incidence of disease in terms of mortality and morbidity.

Further, caution must be exercised in using existing data for analysis because of apparent baises in the collection systems which favor the reporting of certain diseases over others, are based on varied and often conflicting definitions, etc. The improvement of national statistics is therefore viewed as an essential step in providing the very framework for planning, implementation and evaluation of health programs which will effect a significant change in the health of the African population.

I. C. SOCIO-ECONOMIC DEVELOPMENT AND INCOME DISTRIBUTION

It is useful to consider the extent to which other indicators of socio-economic development are linked to health problems facing people in Africa.

Income Distribution

Although income is not as unequally distributed in Africa, as in other regions of the world,[1] there is a substantial amount of unequal income distribution in certain specific countries, i.e., Nigeria, Kenya and several southern African countries (see Table I-C.1.) Where the distribution of income is highly skewed, it normally manifests itself in the increased presence of slum conditions and poor housing in urban areas. In addition, where there is a general lack of employment opportunities and a prevalence of unclean water supplies and unsanitary living conditions, increased interaction between disease vectors and the population occurs which leads to increased morbidity among large segments of the population, i.e., poor people.

It has also been hypothesized by Kocher, "that equality in the distribution of the development process and its benefits (simplified to 'improved rural incomes widely diffused...') will lead to a more rapid modernization process among a larger proportion of families, which in turn will lead to a more widespread desire for small families and hence an earlier, more rapid and sustained overall fertility decline."[2] To the extent that income distribution does have an effect upon fertility, it is an important factor which can affect health particularly of mothers and children in Africa.

TABLE I-C.1: INCOME DISTRIBUTION IN SELECTED AFRICAN COUNTRIES

Country	GDP per Capita in 1965 (US$)	Income Shares Received by Quintiles of Recipients Around 1965 Lowest 20%	21-40%	41-60%	61-80%	81-95%	96-100%	Gini Ratio
Chad (1958)	68	8.0	11.6	15.4	22.0	20.0	23.0	0.35
Dahomey (1959)	73	8.0	10.0	12.0	20.0	18.0	32.0	0.42
Niger (1960)	81	7.8	11.6	15.6	23.0	19.0	23.0	0.25
Nigeria (1959)	74	7.0	7.0	9.0	16.1	22.5	38.4	0.51
Sudan (1969)	97	5.6	9.4	14.3	22.6	31.0	17.1	0.40
Tanzania (1964)	61	4.8	7.8	11.0	15.4	18.1	42.9	0.54
Madagascar (1960)	92	3.9	7.8	11.3	18.0	22.0	37.0	0.53
Morocco (1965)	180	7.1	7.4	7.7	12.4	44.5	20.6	0.50
Senegal (1960)	192	3.0	7.0	10.0	16.0	28.0	36.0	0.56
Sierre Leone (1968)	142	3.8	6.3	9.1	16.7	30.3	33.8	0.56
Tunisia (1971)	187	5.0	5.7	10.0	14.4	42.6	22.4	0.53
Ivory Coast (1959)	213	8.0	10.0	12.0	15.0	26.0	29.0	0.43
Zambia (1959)	207	6.3	9.6	11.1	15.9	19.6	37.5	0.48
Gabon (1960)	360	2.0	6.0	7.0	14.0	24.0	47.0	0.64

Source: Table 6, pgs. 114-115, Felix Paukert, "Income Distribution at Different Levels of Development: A Survey of Evidence," International Labour Review, 108, 1-2 (Aug., Sept, 1973).

Employment

As is shown in Table I-C.2, one of the most pressing problems facing African countries today is that of employment, particularly in urban areas. This problem has led, in conjunction with migration and the lack of educational opportunities, to many mental health problems manifesting themselves within the population as reported in Leighton et. al.[3] The dislocation caused by migration to urban areas particularly tends to affect the physical and mental health of individuals who are often forced to live alone. The manifestation of the health problems of such individuals often are revealed through criminal activities and the contraction of certain infectious diseases such as gonorrhea and syphilis. These can spread throughout a population as a consequence of being unemployed and engaging in criminal or other antisocial activities to obtain a nonformal income, e.g., stealing and prostitution.

Disease can also reduce the productivity of those employed in Africa. Besides the effect of schistosomiasis on health status mentioned above, it has reduced the quantity of productive labor, particularly in Egypt and the Sudan in irrigated cash crop areas along the Nile. In addition, John Cleave[4] has reported that in some areas of rural Africa, labor shortages develop during periods of peak demand for agricultural labor, in part due to increased incidence of certain diseases, such as malaria. As a consequence, some crops are neither planted nor harvested.

TABLE I-C.2: URBAN UNEMPLOYMENT RATES IN SELECTED AFRICAN COUNTRIES

Country (Urban Centers)	Unemployment Rates	Country (Urban Centers)	Unemployment Rates
AFRICA			
Algeria (1966)	26.6	Nigeria (cont'd.)	
Camereons (1966)		Onitsha	26.3
Douala	13.0	Kaduna	30.8
Yaoundi	17.0	Abeokuta	34.6
Ivory Coast (1963)		Congo (1958)	
Abidjan	20.0	Leopoldville (Kinshasa)	15.0
Ghana (1960)		Tanzania (1965)	12.6
large towns	11.6	Kenya (1969)	
Morocco (1960)	20.5	Eight urban areas	17.4
Nigeria (1963)			
Lagos	15.5		
Ife	19.7		

Source: Michael Todaro, "Industrialization and Unemployment in Developing Nations," Paper Prepared for Workshop on Economic, Social and Political Consequences of the Green Revolution, New York State College of Agriculture, Cornell University, June, 1971.

Education

Although there has been a rapid increase in the number of children attending school throughout Africa subsequent to the Addis Ababa Conference on Education in Africa held in 1961,[5] literacy rates for most African countries are still low, i.e., 10-20% of the population. In Table I-C.3, data are presented which show that in many parts of Africa, between one-third and one-half of primary aged children are attending school. This figure drops significantly for secondary aged children where, in most instances, the figure is less than 10%. This data suggests that any health education or personal hygiene strategy which is attempting to reach the entire population of a given country must be presented through several media and cannot rely on a literate public.

The data in Table I-C.3 does suggest, however, that although there is not a majority of children in any age attending school, a considerable number are attending. As a consequence, it is important that school curriculum incorporate as much information about health and hygiene as possible. We would recommend that a modest investment be made to determine the extent to which all African countries' curriculums contain relevant components of health and hygiene.

There have been a number of studies conducted in African countries which have suggested that the educational level of the female is one of the primary factors which determine size of family: The lower her educational attainment, the greater the number of children a women will tend to have.[6] Since improvements in female education

TABLE I-C.3: PERCENT OF POPULATION AGED 5-14 YEARS AND 15-19 YEARS ENROLLED AT FIRST AND SECOND LEVELS OF EDUCATION, 1963, AND PERCENT OF ENROLLEES AT FIRST AND SECOND LEVELS OF EDUCATION WHO ARE FEMALES, 1964

SELECTED AFRICAN COUNTRIES

Country	% Population 5-14 Enrolled	% Females 1st Level	% Population 15-19 Enrolled	% Females 2nd Level
Botswana	67	56	4	40
Cameroon	79	31(2)	8	20
Chad	19	15	1	7
Ethopia	6	26	0.8	14
Ghana	54	45	37	32
Ivory Coast	38	32	6	12(3)
Kenya	53	35	5	29
Malawi	43	37	3	28
Morocco	34	29	9	24
Nigeria	31	39	6	29
Senegal	27	34	8	25
Sierra Leone	18	33	5	27
Sudan	14	32	6	18
Tunisia	57	34	20	27
Uganda	26	36	8	26
Tanzania	25	36	3	24
Upper Volta	9	28	1	20
Zaire	54	31	6	11
Zambia	54	43	3	20

Source: Table 34, pp. 353, 354, and Table 35, pp. 359, 360 United Nations, Compendium of Social Statistics: 1967, (United Nations; New York, 1968).

Notes: (1) General Secondary only. Excludes Vocational and Teacher Training

(2) 1960

lead to a reduction in the number of pregnancies, thereby reducing the incidence of pregnancy problems, anemia and congenital problems of young children, the health of mothers and children can be improved. In addition, the impact of increased education on mothers improves basic hygienic practices and nutritional understanding such that children will be less susceptible to disease and early death. In Table I-C.2 data are also presented which show the extent to which females are receiving education in African countries. It is clear that a considerable improvement in female education -- particularly access thereto -- at the secondary level, can be justified solely on the grounds of fertility reduction and its related positive health impacts.

II. EXTENT OF DONOR ACTIVITY IN HEALTH IN AFRICA

The total amount of bi-lateral and multilateral official development assistance to Africa in CY 1972 approached $3 billion. One-fourth to one-third of the assistance was multilateral assistance and the rest was bi-lateral. The official development assistance figures are derived from tables II.1, II.2, and II.3 in the Appendix. In addition to "official development assistance" a number of private development activities are underway. They are usually financed by multinational corporations. While the existence and importance of these activities is recognized, the magnitude of such flows is difficult to determine.

Of the total amount of development assistance that went to Africa in CY 1972, at least $38.8 million was allocated to the health sector by WHO, UN agencies and USAID. As a consequence of our preliminary investigations, it is estimated that approximately 2% of total development assistance to Africa from official sources was allocated to the health sector in CY 1972.

Multilateral Donor Agencies in Africa

In 1972 WHO spent $20.9 million ($13.8 Million from its Regular Budget) in Africa. Estimated total WHO expenditure for Africa from the WHO regular budget and other sources are:

1973	1974	1975
$25.7 million	$24.8 million	$24.0 million

WHO priority objectives for 1975 for the African region are: education and training, national health planning, development of integrated health services, communicable disease control and environmental health. The WHO African Regional Statement and program are contained in Appendix II.4.

In addition to the projects financed by its regular budget, the WHO is the coordinating agency or the executing agency for many projects that are financed in whole or in part by other international agencies.

UNDP finances 46 projects in Africa in which WHO is involved. Eleven of these are pre-investment or construction projects in water supply, sewerage and drainage; fourteen are for communicable disease control; fourteen are for strengthening of various aspects of health services and seven are for the development of health manpower.

UNICEF has given important aid in 32 African States to projects for strengthening of health services, which include health manpower and development activities. UNFPA assistance supports one health education team and eight family health projects. The World Food Programme is involved in 47 projects of various types the majority of which have health components.

World Bank

Health as such is not presently an official field of lending for the World Bank. However, the Bank is involved in a number of health related projects in Africa. The health investment part of health projects in which the Bank Group is presently involved in Africa is

$44.8 million. (Table II.5 in Appendix) About half ($21.8 million) is being invested in population control programs and the remainder is allocated among health education, drainage, irrigation, health center construction projects and the onchocerciasis project.

Extent of Bilateral Donor Activities in Health in Africa

The following table is taken from the 1974 US/AID Presentation to Congress for Africa. It summarizes the extent of US/AID for Africa for FY 1972, 1973 and the proposed amount for 1974.

AFRICA

PROGRAM SUMMARY
(In millions of dollars)

FISCAL YEAR	Total	Food Production and Nutrition	Population Planning and Health	Human Resource Development	Selected Development Problems	Selected Countries and Organizations	Other Programs and Support costs
1972							
Devel. Loans	104.0	34.2	-	9.4	60.4	-	-
Devel. Grants	67.5	16.0	14.2	18.7	3.6	2.1	12.9
Other	3.7	-	-	3.7	-	-	-
Total	175.2	50.2	14.2	31.8	64.0	2.1	12.9
1973							
Devel. Loans	96.0	16.0	5.2	0.6	44.2	30.0	-
Devel. Grants	66.2	17.6	13.3	15.1	6.4	1.5	12.3
Other	-	-	-	-	-	-	-
Total	162.2	33.6	18.5	15.7	50.6	31.5	12.3
1974							
Devel. Loans	80.0	30.6	-	-	35.0	15.0	-
Devel. Grants	79.6	28.1	16.2	17.6	3.3	2.9	11.5
Other	.1	-	-	-	-	-	.1a/
Total	159.7	58.1	16.2	17.6	38.3	17.9	11.6

a/ Narcotics Control

This table is further evidence of the need to arrive at system for more definitively defining "health". Certainly part of the funds listed under "nutrition" and "human resource development" would be considered as contributing factors to the improvement of health of the continent.

Population planning is of course an important concern in Africa where the average rate of population increase is fast negating the per capita gains that the economic sector is achieving. However, the evidence that is available is indicative of the fact that in order for population programs to be accepted and effective they must be part of a total health services delivery system. In FY 1972, $11.3 million of the $14.2 million allocated for "Population planning and Health" was obligated by the Office of Population in AID In FY 1973, $11.5 million of the $18.5 million in this category was obligated by the Office of Population. Thus, in 1973 only 4% of the $162.2 million allocated to Africa was earmarked for the Health Sector (narrowly defined.)

The question is whether this is an adequate amount for health when one considers present African health status and the very basic role that improved health could play on Africa's development.

Other Bilateral Aid to Africa

More than one and one-half billion dollars in bilateral development assistance was given to Africa by France, the United Kingdom, Germany, Canada and other DAC donors in CY 1972. (See Table II.6 in Appendix.) We have not however been able to ascertain what part of the total was allocated to the health sector. A few available reports described specific health programs but, again, the definitional difficulty between nations as to what is included in "health" became apparent. For example, a multimillion dollar Canadian investment in sewer and water projects in Madagascar was not considered

"Environmental Health" as it would be in the U.S. but, rather was placed in a non-health category.

Need for Health Sector Accounting System

The dearth of figures in the preceeding section belie the need for health expenditure data that has been recognized by organizations like WHO for decades. An essential step toward an international accounting system in health would be agreement on a uniform general classifications system that would clearly define "health" and its related subdivisions. For example, should population control, nutrition and sewer and water development programs be considered health? And, if so, to what extent? -- Or, how far can one go before double-counting takes place?

It is hoped that participants in the African Donor Nations Conference which will probably take place in 1975 will be able to reach agreement on some of these definitional accounting problems in health. It would seem that this kind of agreement would result in more precise health accounting systems which are essential for effective coordination of donor nations assistance programs.

III. A. THE RATIONALE FOR HEALTH INTERVENTION

Basically two criteria have been used to rationalize intervention either by government or other societal institutions in any particular social activity. The first criterion is the merit good or a basic human right argument. The main problem with this particular criterion is our inability to precisely define what is meant by a basic human right. For example, does it mean that everyone has a right to an aspirin or a vaccination against smallpox, or does it mean a right to have a heart transplant operation or a job, if that is required? John Bryant suggests, "What one has a right to is to have one's needs taken into account as decisions are made on whom to serve and whom to leave unserved. Social injustice lies not in not receiving health care, but in not being taken into account as health care decisions are made.[1] Given this perspective, it implies that the health care system must accept responsibility for all people, and it must have a technological capability to search through all the health problems of a particular society, and serve those most in need.

Whenever the human right criterion is advocated for providing health care, there is an implied concern for equity. When such a viewpoint is put forth, it is important to determine which of the following types of equity one is advocating: (a) equity in the distribution of health resources, (b) equity in terms of the outcome of the health investment, i.e., the number of persons successfully treated in all parts of a country, or (c) equity in the sense of having an equal health status throughout all segments of the population and for all geographical areas.[2]

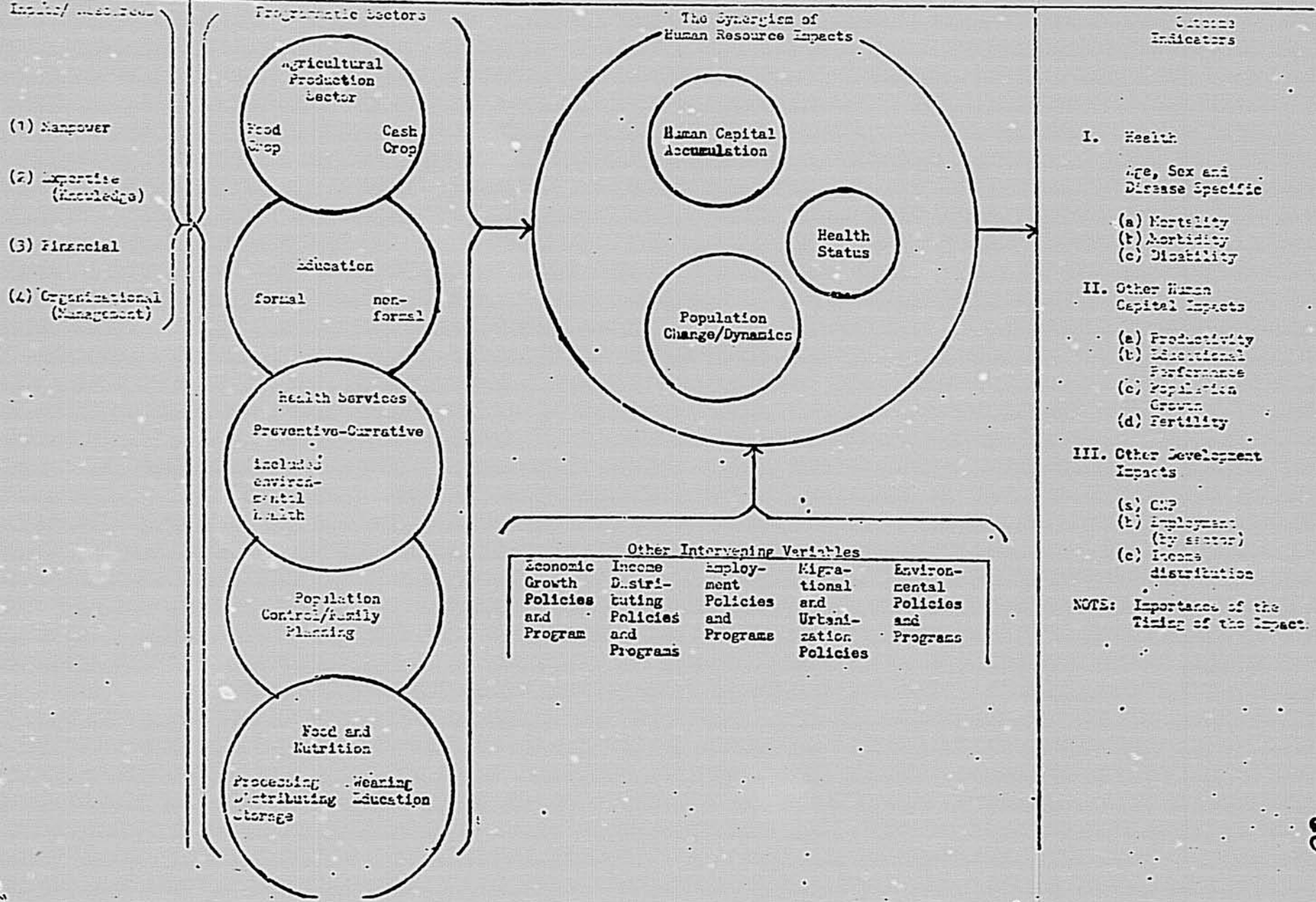
A second group of criteria for public intervention arises when a good or service such as health: (a) has effects on sectors other than the specific sector concerned, (b) exhibits characteristics of public goods, such as joint production or (c) when other market imperfections arise that provide a justification for public intervention. In the case of the most pressing health problems facing Africa, there are significant non-health problems which affect health such as ecological factors, development programs which by changing the ecology create a health impact, etc.

Many infectious and parasitic diseases can spread rapidly from one person to another. Measles, malaria, and cholera represent some of the most important of these diseases afflicting Africans today. The public good nature of preventive health services such as water supplies, sanitation systems and vector control, also justifies public action. Finally, where there is a basic lack of information about methods of fertility control, nutrition, and vector-host interaction, public intervention can be justified on traditional criteria to offset such market imperfections.

III. B. WHERE CAN ONE INTERVENE AND HAVE A HEALTH IMPACT

In this particular section, attention is focused on the ways in which one can invest in a positive health impact. There are at least five sectors in which investments can be made to have a health impact. In figure (1), the major health impact flows are shown. It is important to point out, however, that the figure is a static representation of a dynamic process during which health impacts manifest themselves. There may be more than one way to change the epidemiological structure of disease within a population and it is likely that different interventions require differing periods of time before the impacts occur. The dynamic process of change in the epidemiological composition of diseases is an important area for additional research. An additional factor not included in the analysis is the relationship between an intervention in one sector and the feedback effect on it from a resultant health impact. For example, if a nutrition program has a positive impact on one's health status, that positive health impact, resulting from the nutrition intervention may then increase the success of the nutrition program. These interaction effects are important in improving the health of African people. Investing in a preventive health project, for example, will likely reduce the incidence of a particular disease such as malaria or one of the helminthic (worm) diseases, thereby reducing the necessity for certain nutrition interventions since the effectiveness of utilizing existing food by the body is increased. Similarly, investments in education which have a health impact can, due to improved

Figure 1: A Schematic Representation of the Interactions Between Programmatic Sectors and Health and Other Human Resources Impacts in Developing Countries (of Africa)



health status, improve the learning potential of individuals and thereby yield higher increments to the human capital stock from other educational activities.

Health Services Sector

Turning to the specific interventions considered, it is important to recognize that one can have a positive health impact by direct intervention in the health sector either by providing preventive health services, curative health services, or, in the case of the strategy for malaria eradication, a combination of both preventive and curative services. In Table III-D.1, one can see at least 12 different preventive health services intervention possibilities. One can disaggregate the preventive health services into two major types: those which are privately consumed, such as vaccinations and immunizations, and those which are publicly consumed such as certain environmental health services, i.e., clean water supplies, sanitary waste disposal, as well as air and food quality standards. When one analyzes the range of alternative preventive health service interventions in relation to the types of diseases upon which these health services have an impact, one can begin to evaluate the extent to which one preventive health service may be more desirable than another, given the disease mix in a particular country. AID has had considerable experience in providing preventive health services in Africa, particularly in Central and East Africa, in the smallpox and measles eradication program. Although the smallpox eradication program has been quite successful, the recently developing famine condition

in the Sahelian region of West Africa has taught us that the relationships between malnutrition and measles infections are extremely high. As a consequence one may want to evaluate the present preventive health intervention strategy in relation to alternative ways of dealing with the measles problem. Perhaps one way of dealing with this problem is by increasing food consumption in the "at risk" subgroups, especially young children.

In certain circumstances, curative health service intervention can be important in at least four ways. First, by intervening directly into illness episodes one prevents further reductions in an individual's functioning level, thus conserving human resource levels. In addition, for many illnesses, a curative intervention strategy is the only efficient method of intervention. For example, where the incidence of automobile accidents are increasing in Africa, due to the rise or urbanization and the use of automobile transportation, the availability of curative health services can be extremely important in emergency medical care. There is a question, however, as to the extent a donor agency should invest in such an intervention strategy, primarily due to cost.

Second, a curative health service system can be very decirable as an intervention strategy where equity considerations are important to decision-makers. Where the "visibility" of the health intervention is of importance, a curative health service strategy can be helpful.

Third, a curative health service intervention strategy can be important when certain preventive health services have significantly reduced the incidence of certain highly contagious diseases. Curative health services, at that point, can be useful in the final maintenance and surveillance stages of an eradication program. This approach to curative health services has been emphasized by WHO in its malaria eradication program strategy, and is used in maintaining cholera.

Fourth, a curative health service can provide the basic health facility structure required for rapid diffusion of other health intervention programs such as health education, nutritional supplements, and family planning. The availability of backup curative services for complications which may arise subsequent to the utilization of certain types of family planning services can be extremely important for the long-run success of the program by reducing side effect complications. In addition, the health facilities can be the focal point for a comprehensive program in maternal and child health.

Nutrition

There has been a recent increase in interest in the role of nutrition in development and particularly its impact on the quality of life of poor people in developing courtries. In particular, nutrition research has focused on the interactions between infectious diseases, particularly in young children, and various manifestations of malnutrition. The recent drought in the Sahelian region of Africa has

drawn increased attention to the interrelationship between malnutrition and the rapid increase in at least two major infectious diseases, namely measles and cholera.

One can intervene in the nutritional status of the population in a number of ways. Some of them focus on the supply side of the nutrition problem such as increasing food output and increasing storage facilities to reduce the fluctuations in the supply of food at critical points during the year to "at risk" subgroups of the population, i.e., children and lactating mothers. By expanding food production through new seed varieties, by increasing the use of fertilizer, and improving methods of cultivation, one can increase the total output of existing food crops. In addition, agricultural development activities focus on improving storage facilities, and the food marketing system which can increase the supply of available food to consumers at a given price. It should be added, however, that rarely are the health impacts of agricultural development activities precisely defined or subsequently monitored.[2]

One can also attack the nutrition question on the demand side through programs in nutritional education, particularly those that demonstrate how nutrition relates to productivity and health. Tanzania, at the present time, has a large health education program underway which includes a nutrition education component which focuses on the interaction of consumption of certain commodities and one's health.[3] In addition, many nutrition concepts have been introduced into programs of maternal and child health and family planning in

Africa. These ideas have been introduced in many curative and preventive health services facilities through assistant health visitors, nurses and midwives who are in charge of maternal and child health clinics in the countryside.

Nutrition is also an economic development problem. The poor family cannot afford to buy foods with high nutritional value in large quantities throughout the entire year. As a consequence, programs which are designed to increase income by increasing employment, both on and off the farm, and by increasing agricultural productivity can have a positive nutritional impact and thus improve health. Finally, nutrition can affect the health status of a population, particularly its mental health and its capacity to learn. This situation is particularly true when severe malnutrition occurs either at a very young age or in the fetal stages of development.

It must finally be said that in order for nutrition programs to achieve maximum cost-effectiveness in Africa, potential health impacts should be incorporated into the analysis. Of the major health concerns reported by 28 Ministries of Health in Africa, during the middle 1960s, at least four -- Helminthiasis (worms), Pilharzias, Diarrhea and Dysentery, and Enteric Fevers -- impose major constraints on the capability of nutritional programs to improve the health status of populations.[4] Since such illnesses are prevalent in many African countries, the absorptive capacity of the human body to properly utilize nutrients provided to the individual can be severely curtailed.

Given this problem it is important that these nations' nutrition programs, in order to be cost-effective, be closely related to a health program which addresses these particular illnesses.

Family Planning and Demographic Change

It is clear that the rate of demographic change is very high in Africa (rates of population growth of 3.0% per year are not uncommon.) This high rate of change is largely attributable to significant declines in infant mortality. For example, in East Africa, where census data generally provides reliable information, infant mortality has declined by 50% in the last 25 years to around 100-120 per thousand. Such a change in mortality rates has led to increases in family size which can exacerbate poor living standards. Large families tend to reduce food consumption, increase over-crowded housing situations, and increase the potential for the transmission of certain infectious and parasitic diseases, such as TB.

At the same time, fertility levels among females can lead to major health problems for the mother and child as was described earlier in the paper (I-C). Thus, programs designed to reduce the incentive for large family size, particularly where frequent pregnancies occur, can have a positive health impact not only on the mother but also on the entire family.[5] For example, children in large families tend to have more nutritional deficiencies leading to related health problems. By not only providing the technology for limiting family size, but also the incentives for increasing the utilization of those technologies, one can obtain a positive impact on the total health of a population.

It must be noted, however, that in order for programs of demographic control to improve health status, the utilization of the appropriate technology must increase. There has been success reported in the marketing of condoms in East Africa[6], as an individual family planning method. There are great natural incentives to consume curative health services. Why not expand the complementary set of family planning services as an integral part of the basic curative health delivery system so as to minimize the potential health hazards of certain family planning methods and, at the same time, increase the incentives for the consumption of family planning services?[7]

Education

One can intervene on the health status of the population by using both the formal and nonformal educational systems. By expanding the formal education system, one can have an impact on the information level and values of a large and increasing proportion of young people. Not only can one use the education system to change political views, but one can also influence styles of life which can improve health status. By teaching about disease transmission, personal and societal health habits can be improved.

In addition, a positive health impact can be obtained by investing in the formal education system to increase the number of qualified workers in the health field, not only in direct health service occupations such as medicine and nursing, but also in managerial positions. If manpower constraints are restricting the expansion of basic health services to the people, investments to expand the formal

education system may be useful, particularly where the supply of existing manpower cannot significantly increase its productivity by managerial, motivational, or organizational changes.

To the extent that poor health conditions adversely affect the attendance and work capability of both students and teachers, a country's education system can easily be thwarted in performing its function of improving the human capital stock embodied in the population. There has been very little research conducted on the morbidity rates among African students, in order to determine the extent to which student populations are constrained by specific health problems in attaining their educational objectives. Without such information, it is difficult for the education system to develop a specific intervention strategy to alleviate these health constraints. In one African country where some research on the health problems of higher school and college students has been conducted, it was found that venereal disease and automobile accidents were the major health problems. Although a health education program was developed to meet these needs, the impact of this program has yet to be evaluated.

Projects related to community education, community development, and health education which provide educational and recreational outlets for adult females can be extremely useful in changing their personal health behavior, and subsequently, that of other members of the family. The use of mass media in nonformal health education programs has been initiated throughout Africa. In Zambia and Ethiopia a number of health education efforts have been conducted using posters and

other media. In Uganda, national television was being used for health education. Perhaps the most important development in health education has been the expanded role of radio in transmitting the message throughout Africa. The transistor radio is pervasive, even in rural areas, and Tanzania has been one of several countries to develop a health education program utilizing radio communication.[8]

In addition, the nonformal education system can be helpful in assisting young migrants who find themselves unemployed in the urban areas of Africa. The nonformal system of communication can be extremely important in postponing and reducing the mental health impact of such changes. Such programs may also assist in alleviating problems of alcoholism, stress, and hypertension which can occur subsequent to obtaining a high occupational position in African countries.

Agricultural Development

As was discussed above in the section on nutrition strategies, it is clear that an improvement in nutritional levels can result from increasing the supply of food, particularly of a high protein content, and reducing distribution problems through the year. Other rural development activities such as land clearing can reduce the incidence of disease transmitting vectors. If real incomes of rural persons can be increased, a larger market basket can be acquired including a greater consumption of food throughout the entire year. Besides consuming a greater quantity of food, there is strong evidence to suggest that increased income leads to increased consumption of higher quality foods, particularly those with high protein.[9]

III. C. AN EVALUATION OF ALTERNATIVE INTERVENTION APPROACHES

The Alternatives

AID has had considerable experience in assisting developing countries in Africa. It is useful to review briefly at least seven ways in which AID, perhaps in concert with other agencies, might intervene or continue to intervene to improve the health status of African countries. These alternative interventions can occur in any sector described in the section above, i.e., in the provision of preventive or curative health services, or through programs in nutrition, family planning, education or agriculture.

Direct Service Delivery

AID has engaged in the direct provision of development services through contractors in many African countries. For example, it has organized and supported with government cooperation, health service delivery systems (e.g., in Liberia, Kenya, Uganda, Ethiopia, and Zaire). and road building programs (e.g., Tanzania and Kenya). However; such a strategy has become less popular in recent years, both from a political as well as an economic development point-of-view, since, in many instances a long run institutional development impact has not been forthcoming.

Technical Assistance in Service Provision

Technical assistance has been provided to governmental and voluntary organizations delivery health services or providing other services having a health impact. An important way of providing such assistance in the past has been by strengthening African medical schools

and paraprofessional training schools. In addition, a number of technical assistance experts have been provided for programs in agriculture, nutrition, rural development and population control. Such personnel have often been involved in the direct delivery of a service, or the implementation of agricultural production. Technical assistance has also been provided to governmental ministries to improve their capacity for service provision.

Management Assistance

Management assistance is distinct from technical assistance in that it is more a coordination function dealing with the process of organizing and delivering service rather than in the technology of production. Perhaps one of the most important ways that AID can provide such assistance is in the recruitment of managerial talent to work in the health sector or in institutions having an impact on health in African countries. Incumbent upon this kind of assistance is a requirement for some managerial training for indigenous personnel.

Planning Assistance, Including Project Appraisal

Planning assistance can be provided in one of several ways. One can provide such assistance directly to Ministries of Economic Development or Health in African countries. In addition, planning assistance can be provided to specific African countries or regions from locations external to the country or region. The efforts presently underway by U.S. AID, in conjunction with other international organizations, such as World Health Organization, the French Planning

Organization, and the Canadian Development Organization, in developing a strategy for strengthening public health delivery systems in West Africa, is another example of planning assistance which the agency can provide.

Perhaps more important than this kind of planning assistance however, is for AID to continue to assist governments in defining their information requirements for planning and management activities of specific ministries. The development of a capacity to improve the quality of data gathered and improve the process by which it is organized and analyzed for basic day-to-day management decisions required in the health system and related systems, is perhaps the most important planning assistance which can be offered.

Finally, AID, in consortia with the World Bank, can assist in improving present methods of project appraisal for health and health related investments. It is clear that such methodologies have an impact on resource allocation in health and related sectors.

Manpower Training, Development and Utilization

It is important to increase the supply of trained manpower available for: (a) delivering health or related services, (b) managing service delivery systems; and (c) planning the future development of health and related services. It is possible to provide such assistance to health and medical education institutions in Africa, but also by supporting scholarship programs for short-term or degree courses in other parts of the world.

More consideration must be given, however, to the question of how to improve the management capabilities of middle and high level health workers and thereby improve the utilization of scarce manpower resources. The agency could make a major impact on the organization, coordination, and delivery of health services with a relatively small investment by designing short-term education program activities in health management. A related program is presently operating for the Latin American region under the aegies of the Economic Commission for Latin America.[1]

Single Donor Vs. Consortia Approaches

Although it is not always feasible to act in concert with other organizations, a consortia approach can be more effective in improving health status of people since it can mobilize: (1) more resources for a particular intervention program, and (2) a greater world response to the envisioned project. A broader perspective on the problem can also be obtained when working together. It is clear that AID has considered such positive benefits of consortia activities in health programs since many health programs in which AID has been involved have been developed and implemented on a consortia basis. Perhaps the most notable example has been the West African Smallpox and Measles Eradication campaign.

Voluntary Agency Assistance

Considerable experience in providing health and related services resides in voluntary agencies, such as missionary organizations and other non-sectarian groups like CARE. In many instances disaster and

emergency relief activities as in Bangaladesh, and Nigeria have been coordinated with such organizations. In certain circumstances such organizations may have access counties where governmental organizations may be viewed with suspicion or may not be allowed. Where such situations manifest themselves, providing assistance through voluntary agencies can be useful.

D. Issues in Evaluation and Improvements in Criteria for Ranking Projects

Given the fact that all agencies and governments have limited resources, it is incumbent to discern the most effective intervention. In the health field, it is particularly important to consider this problem. Although there have been increasing efforts made to develop an appropriate method of evaluation of health and related programs, there have been considerable difficulties in determining an appropriate outcome indicator for use in evaluating all health programs. When one uses a combination of mortality, morbidity and debility to construct an index for purposes of evaluation it is important to discern the relative weights attached to a change in each. In addition, it is generally difficult, in the short-run, to determine whether a change in health status has, in fact occurred, due to the relative imprecision of presently available means of detecting change.

Population program evaluation has had similar problems in developing sensitive indicators of programmatic effectiveness. As a consequence of the general lack of final outcome indicators for population programs, short-run evaluation efforts have utilized process indicators such as the number of persons attending family planning clinics or consuming specific family planning services. In addition, the distribution of facilities, or the number of resources used in the delivery of services have often been used in program evaluation studies. While such process indicators may be useful for managerial

purposes, more effort is required to improve the capacity of African countries to monitor health and demographic change programs.

As in family planning programs, there is a tendency in the field of health to evaluate a program's effectiveness much too soon, before adequate information is available. Longer-run evaluation efforts are more appropriate, since many health impacts do not quickly manifest themselves particularly where synergistic effects of changing the incidence of one disease upon another disease require time to work out. The World Health Organization study on infection and malnutrition conducted by Schrimshaw, Taylor and Gordon,[3] is particularly useful in this respect to understand the interaction process between nutritional deficiencies and infectious and parasitic diseases, and particularly for those diseases which affect young children.

Finally, in order to evaluate alternative health service delivery systems, it is important to recognize the multi-project nature of the system which provides a number of different treatments to a number of diseases. Work by Martin Feldstein, Dunlop, and the John Hopkins group are beginning to demonstrate progress in using linear programming techniques in this area.[4]

Benefit-Cost, Cost-Effectiveness, and Other Analytical Methodologies

Although a benefit-cost methodology is useful in evaluating health programs, the experience to date has generally been poor in adequately measuring the benefits. A more useful methodology is cost-effectiveness analysis where the use of both quantitative and qualitative indicators of effectiveness can be incorporated into the analysis.

In using this methodology, it is desirable to have as many quantitative indicators of effectiveness as possible. However, where such do not exist, the use of qualitative judgements can be incorporated. The range of effects can be individually analyzed as can the relative trade-offs between different outcome indicators and programs. It should also be added that cost-effectiveness analysis, when used to assist decision making and policy formulation in health, can provide a framework for seeking and defining alternative means to attain given objectives. When used in such a way, thought patterns can be structured in useful directions.

Simulation methodologies can be utilized to more effectively analyze feedback effects of an eradication program, particularly when a significant change in the incidence of an endemic disease occurs. It would also be appropriate to use such a methodology for analyzing the health and other socio-economic effects of a significant increase in caloric and protein intake throughout a country. When a particular program has macro-impacts, the use of micro-methodologies leads to incomplete analyses and the results must be interpreted with caution.

Incorporating Equity Considerations

There has been increasing interest in incorporating equity considerations into the evaluation process. To what extent should health or other social investments be made solely on humanistic grounds, irrespective of society's payoff? Although it is often difficult to determine the concept of equity being advocated when a

health or related program is proposed, it is possible to develop an indicator for use in monitoring changes in that concept. An information network can be established to evaluate a particular program if the appropriate concept of equity to be used in evaluating the program is defined early in its development.

Further Comments Towards an Improved Framework for Ranking Health Related Projects

There are at least three possible ways in which significant improvements can be incorporated into the process of ranking investments in the health area. First, there are a number of impacts both of a primary and secondary nature which result from a health-related investment. An immunization program which leads to a reduction in disease specific mortality and morbidity provides a clear cut example of a direct impact. The impact from such a program can be contrasted to the long-range impacts resulting from a health education program, which may have as one of its objectives, a change in basic behavior with respect to either the utilization of particular health goods and services, or the way in which individuals eat, sleep and interact with their environment. In addition, health programs, by reducing the incidence of a particular disease, likely will change the incidence of other diseases which may be epidemiologically related. This synergistic concept is particularly useful when analyzing the process of interaction between low levels of nutrition and infectious and parasitic diseases. Finally, the impact may accrue to different age and sex groups over different time periods.

Although Dr. Omran, in his article on the Epidemiologic Transition[5], has begun to develop a consistent epidemiologic transition framework, it is important to recognize that the impact of a particular program in terms of the overall pattern of disease, as measured from a mortality, morbidity or debility perspective, has not been well articulated to date. However, there must be increasing use made of the basic synergistic concepts in order to discern the relationships between health problems. These relationships should be incorporated into the process of ranking alternative health interventions, and increasing efforts are required to quantify the nature of such linkage.

Second, increasing attention must focus in project appraisal on analyzing marginal additional investments with a potential health impact incorporated into non-health projects in such sectors as education, agriculture and road building. Through the foresight of the Office of Nutrition, certain nutrients are to be added to the processed flour to improve nutritional status for a marginal increment in the total investment. If the nutritionally-related health impacts are concentrated in high risk segments of a population, they can yield substantial benefits with only a marginal financial addition to the project. Perhaps an example of the importance of marginal additions to existing or proposed projects from the African continent is in irrigation. In such projects, a marginal health maintenance program could help to keep the prevalence of helminthic diseases at a low level.[6]

Third, "critical minimum investment levels" may be necessary in order for certain health impacts to manifest themselves. For example, it is clear that for AID to have invested in country-specific smallpox and measles eradication programs in West and Central Africa, the program would have resulted in virtual failure (assuming that famine did not break out) since the vectors of these diseases do not readily identify national boundaries and turn back from those countries where significant progress in eradication has occurred. WHO learned about the nature of critical minimum efforts with respect to its programmatic strategy for malaria eradication in Africa. It found that in order to make any significant headway on this health problem, critical minimum investments must be made not only by one government, or by one donor, but by a number of governments and a number of donor agencies over a considerable period of time, and not solely in the health sector.

What does this concept have to do with a ranking framework for potential investments in health? It implies that the scope of evaluation of potential investments must be expanded to include a wide range of alternatives and it must be innovative in considering the impact of large investments as well as very small investments (size being a function of monetary investment levels.) It also implies that ranking schema must include a number of outcome indicators which can be evaluated depending upon the relative weights government officials use in decision-making. For health programs such methodology is imperative. Dr. Ruderman has said that the most important thing

for an organization making investments in health is not to have a single way of evaluating investments. Rather, he suggests that it is important to focus on the individual case, to determine the extent to which the health problems prevailing in a country are working against development objectives. Upon making such a determination, analytical skills can be applied to the problems of a given locale.[7] Although these concepts do not lead to a single ranking methodology to follow for analyzing health investment, they do provide us with an improved understanding of the complexity and interrelatedness of the factors affecting a positive health status.

IV. RECENT U.S./AID POLICY TOWARD AFRICA

During the early 1960s the U.S. Congress appropriated the highest amounts of AID funds to Africa that have ever been appropriated. But, at the same time there was a sharp decline in the amount of AID funds that were specifically earmarked for "health" funds for Africa. There was also a continual reduction in the number of health personnel slots that were allocated for Africa.

During the middle and latter half of the decade of the sixties Congress drasticly reduced appropriations for all bilateral foreign assistance and reduced funds earmarked for health to a negligible amount. Faced with the dwindling amount of bi-lateral foreign assistance available for Africa in 1965-66, the President ordered a study to determine the optimum method of spending the appropriated funds available for Africa. The result was a 150 page report -- The Korry Report -- which remains today a major policy guideline for U.S. bi-lateral assistance to Africa. The Korry Report codified the recommendation that the best use of the bulk of the limited bi-lateral assistance was that it be allocated for assistance to 10 countries in Africa which became known as the emphasis counties.* (*Liberia, Ethiopia, Ghana, Nigeria, Morocco, Tunisia, Zaire, Kenya, Tanzania and Uganda.) Other countries in Africa could receive AID assistance only if they were participants in a regional program which was AID financed.

With one significant exception there were very few initiatives specifically within the health sector taken by AID following the Korry Report. In 1966 AID participated in a large program directed

toward The World Health Organization goal of eradicating smallpox and measles from the earth by 1975.

A recent critical review of AID policy in the 1960s stated: "As with other aid donors, the U.S. gave foreign assistance in the 1960s on the grounds of development potential and diplomatic interests rather than on the basis of human needs. A 1969 public report to the Congress by AID justified the concentration (on the emphasis countries) solely in terms of such political and economic self interest" ..... (p. 8 Disaster in the Desert).

On behalf of AID, there is no doubt that many of the key policy makers of the period recognized the very key role that health plays in economic development. But, the emphasis was on using what development funds were available to rapidly effect economic indicators through large capital transfers. The policy might have worked in the early 1960s when appropriation levels permitted large capital transfers except that the African nations did not have the institutional capacity to absorb and distribute the capital. We now realize that the problem is not rebuilding institutions as it was with the Marshall Plan and Point Four but rather, helping peoples attain health and education levels that will allow them to develop their own institutions.

Another development in the late 1960s greatly influenced AIDs operations in Africa (as well as in other parts of the world.) It grew out of the public recognition of the severe effects that rapid population growth was having on the economies of the developing world.

Accordingly, the Congress and AID mandated substantial portions of AID budgets for population control programs. Unfortunately while the funds appropriated during this period were sufficient for initiating programs in population control and some related health programs, they were not sufficient for a broadly based attack on the wide spectrum of the health problems that confronted the African Continent. It now seems evident that in order to gain acceptance a population control program must be part of a broader based program -- MCH or a general curative and preventive health service.

It is generally considered that the economic development programs of the past have not placed enough emphasis on contributing to the improvement in the quality of life of the people in the developing world. In December, 1970, Mr. Hanna, the AID Administrator, stated:

> "The well-being of people is central to the objectives of U.S. foreign assistance. Well-being depends of course upon a number of important and closely limited factors. Jobs, education, security and a sense of participation are all initially important, but none have much significance without basic health."

FOOTNOTES

I-A

1. John Hannah, "Closing Remarks", pp. 51, in Selected Papers From International Health Conference, April 25-27, 1973, Washington, D.C. sponsored by the National Council for International Health, (Chicago, American Medical Association, 1973)

2. The United Nations Research Institute for Social Development, Social and Economic Factors in Development: Introductory Considerations on their Meaning, Measurement and Interdependence, Report No. 3 (Geneva: United Nations Research Institute for Social Development, 1966)

3. Dr. Peter Ruderman's remarks were quoted by Dr. John Bryant, in a speech "International Trends for the Humanization of Health Services," delivered at the International Health Conference, Washington, D. C., April 25, 1973, p. 8., Selected Paper From International Health Conference, op. cit.

I-B

1. C. M. Wylie, "The Definition and Measurement of Health and Diseases, " Public Health Reports 85, 1970, pp. 100-104

2. See M. Zubkoff and D. Dunlop, "Consumer Behavior in Preventive Health Services," in Selma Mushkin ed., Consumer Incentives for Health Care, (Prodist: New York, 1974)

3. Regional Office for Africa (AFRO), World Health Organization, "Towards a Philosophy of Health Work in the African Region". (Brazzaville: 1970), p.7.

4. United Nations Demographic Yearbook, 1970. (New York: UN, 1972).

5. See W. Brass, et. al., The Demography of Tropical Africa (Princeton, New Jersey: Princeton University Press, 1968)

6. World Bank, Population Planning Sector Working Paper, (Washington, D.C. March, 1972) p. 26

7. George Saxton "General Fertility and Infant Mortality" in Uganda Atlas of Disease Distribution, edited by S. A. Hall and B. W. Langlands, (Kampala, Uganda: Department of Preventive Medicine and Department of Geography, Makevere University College, 1968)

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8. African Studies Center, Michigan State University, Rural African Current Research in the Social Sciences No. 17: Rural Health in Africa (East Lansing Michigan: Winter, 1972), p. 58 Ed. Simon D. Messing

9. Derek Byerlee, Research on Migration in Africa: Past Present and Future; African Rural Employment Project Paper No. 2, Agricultural Economics Department, Michigan State University, East Lansing, Michigan, 1972

10. AFRO, 1970, op.cit., p. 28

11. "The Smallpox Situation", WHO Chronicle, 26, 9 (September, 1972), p. 399.

12. AFRO, 1970, op.cit., p. 31

13. African Studies Center, Michigan State University, op.cit., p. 46

14. Martin Feldstein, et.al., "Resource Allocation Model for Public Health Planning: A Case Study of Tuberculosis Control", Bulletin World Health Organization, Supplement, 1973

15. Dr. J. Harmon and Dr. L. Kartman, "Onchocerciasis: Poverty and Blindness", World Health (October, 1973) p. 6

16. Charles C. Hughes and John M. Hunter, "Disease and Development in Africa", Social Science and Medicine, 1970, Vol. 3, p. 445

17. Andres M. Kamarch, "Climate and Economic Development", Economic Development Institute, International Bank for Reconstruction and Development, EDI Seminar Paper No. 2, Revised (Washington, D. C.: November, 1972), p. 30

18. Abdel Omran, "The Epidemiologic Transition: A Theory of the Epidemiology of Population Change, "Milbank Memorial Fund Quarterly, 49, 4, (October, 1971), part 1, pp. 509-538

19. Brian Able-Smith, An International Study of Health Expenditure, Public Health Papers No. 32, (Geneva: World Health Organization, 1967)

20. John Bryant, Health and the Developing World, (Ithaca, New York: Cornell University Press, 1969), p. 52

Footnotes, continued

I-B, continued

21. National Academy of Sciences, National Research Council, Public Health Problems in 14 French Speaking Countries in Africa and Madagascar: A Survey of Resources and Needs, Vol.1, (Washington, D. C.: 1966), p. 122

22. It may be a timely research question whether paraprofessional nurse/midwifery training is the most cost effective way of providing sufficient education to females in order to affect fertility patterns and reduce desired family size. Further, if this situation were true, high turnover rates of such personnel should not as is presently the case be viewed with such dismay.

23. John Bryant, 1969, op.cit.

24. National Academy of Sciences - National Research Council, op.cit., p. 12

25. The Danfa project in Ghana sponsored by USAID is an example of this type of experimentation.

26. World Bank, op.cit., p. 18

27. Ibid, p. 19

28. AFRO, op.cit., p. 33

29. National Academy of Sciences - National Research Council, Recommendations for Strengthening Science and Technology in Selected Areas of Africa South of the Sahara, (Washington, D. C.: 1959)

I-C

1. Felix Paukert, "Income Distribution at Different Levels of Development: A Survey of Evidence, "International Labor Review, 108, 2-3 (August-September 1973), and I. Adelman and C. T. Morris, Final Report on USAID Grant Sect.-2236, An Anatomy of Income Distribution in Developing Nations, (Washington, D. C.: Office of USAID, 1971)

2. James Kocher, Rural Development, Income Distribution and Fertility Decline, (New York: The Population Council, 1973). At the present time, Mr. Kocher is in Tanzania, conducting a series of research projects aimed at substantiating, more conclusively, his intriguing theoretical position.

Footnotes, continued

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4. John H. Cleave, Labour in the Development of African Agriculture: The Evidence From Farm Surveys, Unpublished Ph.D. Dissertation, Stanford University, 1970

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III-A

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1. See for example, J. Galea, "Inventory Appraisal and Assessment of the Basic Health Services of Uganda: Developments for a Malaria Eradication Programme," (Jinja, Uganda: Malaria Pre-Eradication Programme, World Health Organization, 1967) and Wiley Mosely, et.al., "Report of the 1966-67 Cholera Vaccine Trials in Rural East Pakistan, No. 4 Five Years of Observation With a Practical Assessment of the Role of a Cholera Vaccine in Cholera Control Programs", Bulletin of the World Health Organization, 47, 2(1972), p. 229-238

Footnotes, continued

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2. As an exception, see the study by H. A. Oluwasanmi, et.al., Uboma: A Socio-economic and Nutritional Survey of a Rural Community in Eastern Nigeria, Occasional Paper of the World Land Use Survey, No. 6 (Bude, England, 1966). The World Bank has also begun to monitor health impacts of certain of its agricultural and rural development projects. See pp. 58, World Bank, A Bank Group Approach to Health Policy, Population and Human Resources Division, Development Economics Department, Washington, D. C., 1974

3. Budd Hall, "Mtu Ni Afya", (Health Education Campaign in Tanzania), Paper 4.6, Institute of Adult Education, University of Dar es Salaam, Dar es Salaam, Tanzania, January 1973, 5 pp.

4. WHO, Third Report on the World Health Situation, 1961-1964, No. 155, (Geneva: WHO, 1967), p. 28-35, presented in Figure 3, p. 30, John Bryant, Health and the Developing World, (Ithaca, New York: Cornell University Press, 1969)

5. Joe D. Wray, "Population Pressure on Families: Family Size and Child Spacing," National Academy of Sciences, Rapid Population Growth (Baltimore, Maryland: Johns Hopkins University Press, 1971)

6. Timothy Black, "Rationale for the Involvement of Private Sector Marketing Institutions in Family Planning in Africa", Studies in Family Planning, 4.2 (February 1973), pp. 25-32

7. David Radel, ed., "Population and Family Planning in Rural Africa," Rural Africana, No. 14 (Spring 1971). This statement does not imply that there should not be further research alternative methods of delivering family planning services in Africa, and we would support such activities.

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4. See, for example, Clem Linnenberg, "How Shall We Measure Economic Benefits from Public Health Services", pp. 1-13, in Economic Benefits from Public Health Services: Objectives, Methods and Examples of Measurement, U.S. Department of Health, Education and Welfare, Public Health Services, 1964; Royal Crystal and Agnes Brewster, Cost-Benefit and Cost-Effectiveness Analyses in the Health Field An Introduction", Inquiry (December 1966), 3-31; and Brian Able-Smith, "Health Policies, Adjustments and Economic Development", in The Role of Social Security in Economic Development, Research Report No. 27, (Washington, D. C.: Office of Research and Statistics, Social Security Administration, U. S. Department of Health, Education and Welfare, 1969)

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