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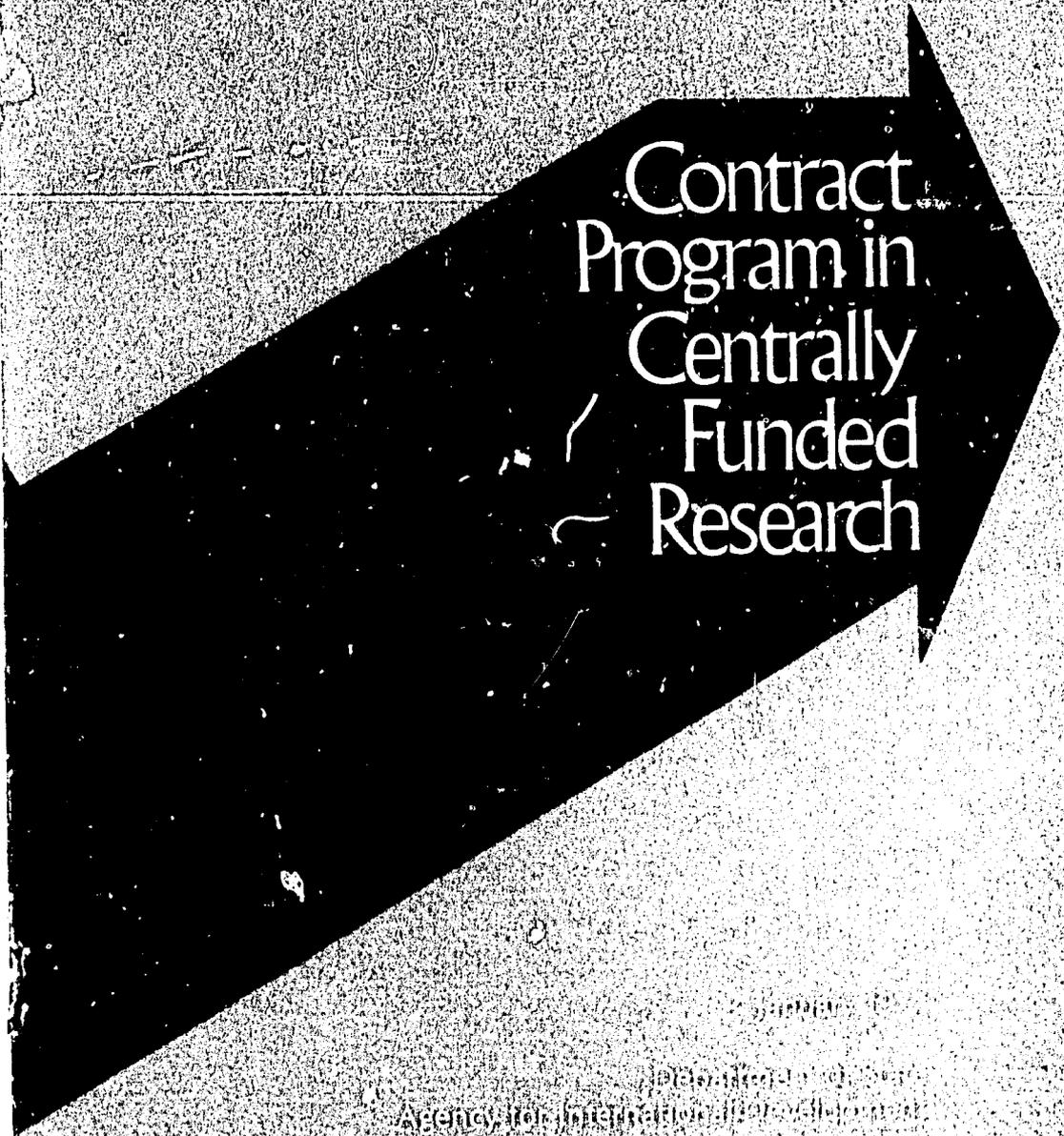
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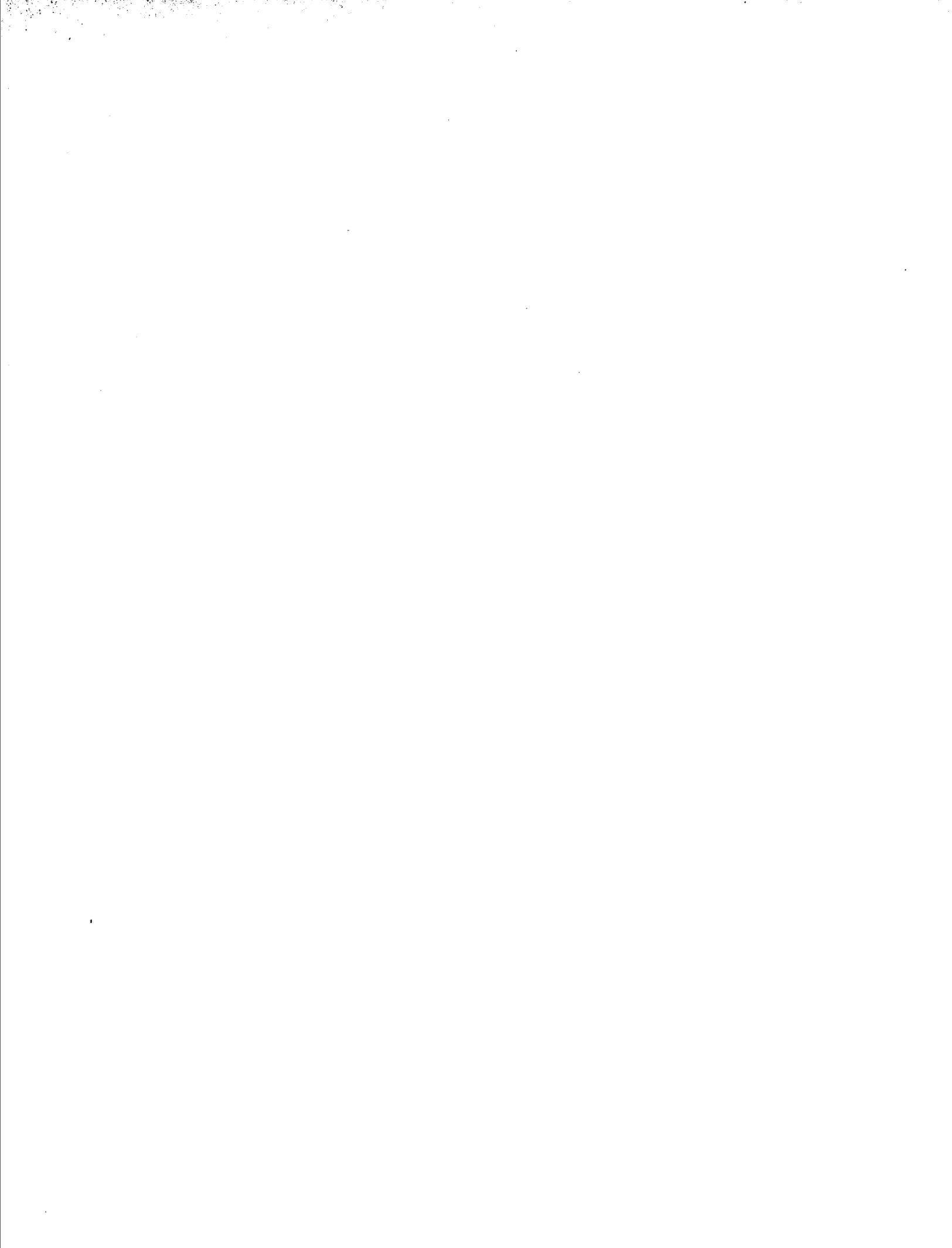
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Contract
Program in
Centrally
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Research

Prepared by
Interregional Research Staff
Bureau for Technical Assistance

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Department of State
Agency for International Development
Washington, D.C. 20523

In accordance with Federal Procurement Regulation subpart 7-1.1003-7(6)(7), the publication of this brochure provides advance notification of general areas in which research proposals are desired. While a proposer may confer with Agency personnel in regard to Agency interest respecting the form of a proposal, it should be understood that the proposer carries full responsibility for the development of the proposal's content.

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. ORGANIZATION	3
III. PROGRAM SCOPE	4
A. Agriculture and Fisheries	5
B. Nutrition and Food Science	11
C. Health	13
D. Population and Family Planning	14
E. Education and Human Resources Development .	15
F. Economic Development and Distribution Problems	18
G. Institutional and Social Aspects of Development (Title IX)	20
H. Development Administration	21
I. Rural Development	21
J. Urban Development	23
K. Women in Development	24
L. Physical and Engineering Sciences and Technology	25
M. Environment, Natural Resources, and Energy ...	28
IV. PROJECT PROPOSAL	30
V. A.I.D. POLICY FOR PROTECTION OF THE INDIVIDUAL AS A RESEARCH SUBJECT	33

EQUAL EMPLOYMENT OPPORTUNITY

In accordance with Title VI of the Civil Rights Act of 1964, no applicant may be denied consideration or appointment under this program on grounds of race, creed, color, sex, or national origin. An Assurance of Compliance with this provision shall be submitted by the contractor to A.I.D. with the letter of acceptance.

I. INTRODUCTION

The A.I.D. Central Research Program serves to assist the Agency in the accomplishment of its assigned mission. It is designed to create and supply new information and technologies which can be used to increase production and income and to improve the well-being of the poor majority in developing countries.

A simple transfer of materials from more advanced countries for use in the developing countries cannot by itself solve the development problem; nor is direct, unadapted application of scientific, technological, or institutional "know-how" enough. The problem is to develop and introduce processes suitably adapted to the local setting in order to remove basic constraints and permit domestic and foreign resources to be used with greater effect. Although sometimes minor local adaptation activities are sufficient, ordinarily these problems require more substantial research. The developed countries have already invested vast sums in the generation of knowledge for their own use. Many such outcomes appear promising for utilization in the developing countries. By critically examining the results of previous research, we can often find situations in which a small additional investment can adapt this knowledge so that it can be used by developing countries. A.I.D.'s limited research budget can thus be more effectively used in the broad problem areas posed by Agency and developing country objectives.

The research program of the Agency for International Development has been in operation since 1962. From that time to June 30, 1976, approximately \$190 million was obligated for some 270 research projects in a variety of fields including agriculture, health, industry, economics, education, population, nutrition, institutional and social development, and housing and urban problems. It has also dealt with techniques of planning and providing development assistance.

The main purposes of A.I.D. research are:

- A. To find solutions to technical, economic, and social problems which significantly impede progress in the developing countries;
- B. To add systematically to our knowledge of the forces and processes at work in the economic growth and social modernization of developing countries;
- C. To explore and create improved technical materials and methods for use in development programs by developing countries, in collaboration with A.I.D. and other assistance agencies; and
- D. To increase the capabilities of recipient countries to solve their own development problems.

This brochure briefly describes the major areas of Agency priority. In these areas we wish to encourage the creative formulation of researchable problems and innovative approaches to their solution. Hence, we look primarily to unsolicited proposals as products of original thinking in implementing our contract research program.

The emphasis of all research proposals for the Interregional Research Program must be on the broad applicability of the potential findings to many countries on a worldwide basis. Country-specific research proposals should be addressed to the specific A.I.D. Mission or the appropriate Regional Bureau. This emphasis does not preclude proposed project work in specific countries as essential test-sites, but the rationale for wide applicability must be clearly stated.

To the extent possible, research projects should be planned to involve developing country institutions and personnel as participants. One objective of research projects should be to develop or enlarge the capabilities of developing country institutions, through their participation, to carry on research and to implement the findings. Recent legislation (Title XII of the Foreign Assistance Act, 1975) which focuses on food and nutrition, encourages the addition to the research proposal of certain non-research elements, such as, training, and other development activities, when they are integrally related to the proposed research. Because we must allocate our resources as effectively as possible, higher priority will normally be accorded research which shows greatest promise for utilization, and which is amenable to ready dissemination to potential users.

II. ORGANIZATION

The A.I.D. Central Research Program is coordinated by the Interregional Research Staff, TA/RES, of the Bureau for Technical Assistance. This staff disseminates information regarding Agency central research needs and solicits the cooperation of the research community in identification of particular areas in which research is important. TA/RES also seeks to improve the overall quality of A.I.D. research efforts so as to enhance the effectiveness of operational programs.

Proposals may be submitted by any research institution. Institutions located in developing countries are particularly invited to make direct submissions. Research proposals submitted in response to this brochure should be sent to the AID/TAB Interregional Research Staff, Washington, D.C. 20523. Informal inquiries about A.I.D. interest in particular research areas are also welcome, and should also be addressed to the Interregional Research Staff.

Proposals are initially reviewed by both the Interregional Research Staff and appropriate technical offices. If a proposal needs further development, the proposer will be invited to alter it in whatever ways seem necessary to make it more directly pertinent to A.I.D. needs.

Research support is generally extended through contracts with educational and research institutions and with private firms or agencies. An appreciable amount of research is also carried on by cooperating Federal agencies by means of Participating Agency Service Agreements. Arrangements for overseas field work by research contractors are made through appropriate regional bureaus (geographic regions) and A.I.D. field missions. A.I.D. will help proposers identify and establish contacts with appropriate institutions in developing countries when so requested.

III. PROGRAM SCOPE

This section outlines suggestions for general fields of research in which the Agency has a continuing interest.

- A. Agriculture and Fisheries
- B. Nutrition and Food Science
- C. Health
- D. Population and Family Planning
- E. Education and Human Resources Development
- F. Economic Development and Distribution Problems
- G. Institutional and Social Aspects of Development (Title IX)
- H. Development Administration
- I. Rural Development
- J. Urban Development
- K. Women in Development
- L. Physical and Engineering Sciences and Technology
- M. Environment, Natural Resources, and Energy

The descriptions of program scope should be viewed as illustrative only. The research proposer will naturally use his own initiative in developing the substance and methodology of particular research proposals.

A. Agriculture and Fisheries

Increased availability of food, coupled with general economic betterment of the rural sector, is one of the most urgent problems confronting the developing world.

Evidence is accumulating to show that support of appropriate research is one of the most profitable forms of investment in agricultural development. This research is needed to generate technology relevant to the needs of the farmer in the developing countries.

In agriculture, the focus of the Agency is on the small operator. Although small farmers frequently constitute a majority in developing countries, commonly they receive inadequate services, such as appropriate farming information, credit, production inputs, marketing opportunities, and protection of land through land tenure laws. These and other problems of small farmers need greater study. Cognizance must be taken of the many constraints facing the small farmer as research is designed to meet these needs.

Recognizing that developing countries have limited resources for fulfilling all their requirements, A.I.D. and other assistance agencies can help requesting countries identify their priority research needs and capabilities. National and international cooperation is useful for sorting out the research needs that can be studied satisfactorily within the developing countries (with their research capability supplemented, if necessary), and those that can be met best by institutions in the more developed countries or in the international centers.

An important element in the Agency's strategy for agricultural research is the development of international agricultural research networks. These networks consist essentially of three echelons of institutions: agricultural research institutions in developing countries; corresponding involved institutions in the more highly developed countries; and the international agricultural research centers.¹

¹ A.I.D. contributes to these Centers, which are under the aegis of the Consultative Group on International Agricultural Research (CGIAR)

International networking provides a powerful mechanism for linking the research resources and experience of the U.S.—and other technologically advanced countries—to the needs of agricultural development in the developing countries. In general, research proposals will be examined in terms of how they involve institutions in all three echelons which are dealing with the general problem to which the proposed research is addressed.

The research areas currently addressed in agriculture include food crops, soils, water, livestock, fisheries and aquaculture, post-harvest technology, and agricultural economics. Brief descriptions follow:

1. Food Crop Production

Present research and development activities concentrate on the major food cereals and grain legumes. Principal stress is placed on improving yield potential, disease and insect resistance, and tolerance to adverse conditions. Considerable emphasis also is placed on improvement of protein content and quality of cereal grains. Breeding stocks and research information are made available to international centers and developing country research institutions for adaptation to specific local and regional conditions. Research also is underway on weed and pest control, with special emphasis on environmental protection and adaptation of control methods to small-farm conditions in developing countries.

There is a clearly indicated need for studies on small-farm cropping systems and on new or modified food crop species other than the major cereals and grain legumes. Special attention needs to be given to tropical adaptation, since the most needy developing countries are principally in tropical areas of Africa, Asia, and Latin America.

2. Soils and Water Management

Current studies are aimed at improving and expanding soil, water, and fertilizer management practices to increase food production, crop yield and quality, small-farm income, protection of soil and water resources, and the incorporation of these improved practices into national, regional, and international programs. The basis for such research is centered on natural resource evaluation and planning to assist developing countries.

Research is underway to alleviate severe crop production problems of hundreds of millions of acres of highly leached acidic but potentially productive soils in Latin America and Africa. The agro-economics of traditional slash and burn methods of crop production, practiced for centuries by small farmers of Latin America, Asia, and Africa, is being investigated. Efficient and economical fertilizers tailored to tropical cropping systems are being developed. A comprehensive study is being conducted worldwide to evaluate the possibility of transferring agro-technology on the basis of soil taxonomy from one tropical region to another tropical region. Research has been initiated in the important field of biological nitrogen fixation in tropical soils.

On-farm water management research in Asia and Latin America is being conducted to demonstrate vast improvement in crop yield and water management in irrigated systems. Various water delivery systems are being evaluated to determine those most feasible and economic for use in developing countries. Water research is aimed at supplying water to the plant roots for improved crop yield. Social and legal factors in water management are also being studied. A new emphasis is management of natural grasslands and ranges for livestock production, protection and conservation of soil and water, and interrelationships with adjacent rain-fed or irrigated cultivated lands.

An area of increasing concern is development, use, and management of rangeland resources. Sound ecological management of these resources will contribute significantly to low energy cost production of animal protein for human consumption. In addition, it will contribute to the conservation of soil and water resources, prevent resource degradation reverse the "desertification" process in many areas, and enhance environmental quality. The integration of rangeland livestock production with cultivated crop production land into viable agriculture production systems is also an area of great opportunity and potential.

Farming systems research is also an area of priority concern. This research should provide information leading to better utilization of available soil, water, plant, animal, economic, and human resources in efficient agriculture production systems.

3. Livestock Production

A.I.D.'s interest in livestock production research centers on the role of livestock in the efficient utilization of agricultural lands that are not suitable or cannot be economically exploited for crop production, and the utilization of feed-stuffs that are not suitable or not destined for human consumption. Attention is given to mixed crops—livestock production systems and to livestock based systems. These activities may be expanded to include research on sheep and goat production.

Feed supply is a principal constraint to livestock production. This includes pastures and forages, range management, supplementation, utilization of by-products and crop residues, and dry season feeding regimes. Research is being conducted in Latin America on mineral supplementation for grazing ruminants.

Animal health research currently focusses on methods of achieving more effective control of hemoparasitic diseases, i.e., anaplasmosis, babesiosis, trypanosomiasis, and east coast fever. Complementary research is underway on the biological control of the tsetse fly in Africa. Also, methods of control of vampire bats, which are vectors of transmission of bovine rabies, have been developed but are not yet being widely used. Additional attention may be given to the control of ticks, in consideration of losses caused by tick infestation and as vectors of transmission of pathogens.

Livestock production systems research currently focuses on the evaluation and development of livestock production systems relevant for developing countries.

4. Fisheries and Aquaculture

The current program is concerned with the development of small-scale (artisanal) fisheries and of aquaculture in fresh, brackish, and salt water, and with the associated problems of fisheries management and conservation. The primary objective of the work is to help increase the productivity, income, and welfare of poor fishing communities and small farmers.

Research underway or projected involves the induced breeding and closed system production of milkfish and mullet; genetics, disease, and nutrition; the production of adequate seed stocks; the development of an integrated system for watershed management and fish culture; environmental studies; stock assessment techniques for small-scale tropical fisheries; and a systems approach to the economics of fish production including studies of demand, social factors, food technology, institutional problems, and marketing systems.

5. Post-Harvest Technology

The potential for reducing known post-harvest food losses as a means of increasing available food supplies in developing countries appear to be large. Recognized causes of food loss occur at various points in the food chain: at the on-farm, transportation, marketing, processing, and consumption stages. Potential savings can contribute to greater food availability and reduced production costs in terms of energy, fertilizer, labor, time, and money. Work has been carried out on the development of cheap drying methods for cereals, storage facilities, homemade transport containers for fish, and the development of rodent and bird control measures. Research is needed on the assessment of problems, the design of model intervention programs, and the development of feasible, acceptable participant programs.

6. *Agricultural Economics and Analysis*

A central focus in agricultural economics is to assist developing countries in developing their capacity to analyze the agricultural sector, including production, employment, income distribution, trade and domestic markets, land reform and land use, and the quality of life in rural areas, with emphasis on problems of small farmers and rural development. Principally through joint projects, advice, and consultation, U.S. researchers collaborate with developing country scholars and officials to increase understanding, to develop workable methodologies for analysis, and to apply the knowledge and techniques to agricultural and rural development problems of developing countries. Agricultural sector analyses in developing countries have resulted in the testing of new methodology for sector analysis, building of local analytical capability, the collection and analysis of primary data on the agricultural sectors of the countries involved, and the planning and evaluation of alternative agricultural development strategies.

A.I.D. is helping to finance an exploration of possibilities for creating employment opportunities in rural areas by substitution of labor for capital in constructing rural feeder roads and irrigation systems. A regional research network has been established for collaborative research on rural employment and food production in tropical Africa; this network has undertaken research on alternative policies to reduce rural underemployment in Ethiopia, Nigeria, and Sierra Leone, including specific studies on women's roles in production. Research has shown the effects of technical change on rural employment and income distribution, and illuminated the role of small farmers in overall agricultural and economic development in India, Thailand, the Philippines, and other Asian countries. Diversification of production has been evaluated in the Philippines and Central America as a means to improve farm incomes, expand exports, and increase rural employment. A.I.D. has sponsored formation of an information network on agricultural credit involving developing country technicians and policy makers and donor agencies.

B. Nutrition and Food Science

Research continues to be needed on nutritional requirements, particularly on protein and calorie needs of infants, pre-school children, and pregnant and nursing women. Research has been concentrated on the development, processing, and formulation of low-cost, high-protein foods and protein supplements derived from indigenous cereals, oilseeds, and legumes grown in the developing countries. Field studies have been initiated in the developing countries to determine the efficacy of fortifying cereals, such as rice, wheat, and corn, with essential amino acids, plant protein concentrates, or fish protein, and with vitamins and minerals. Clinical and biochemical evaluations of the nutritional effectiveness of new cereal and legume varieties and new low-cost foods in combating malnutrition in children are an ongoing part of the nutrition research program.

Programs have been initiated to combat deficiencies in both vitamin A and iron. Action programs to develop methods of delivering these nutrients to target populations are being designed. Research in support of these programs is needed. One major research need is the evaluation of the effectiveness in the developing countries of nutrition education and child feeding programs. A systems analysis of the methods used to combat malnutrition is needed to increase the effectiveness of these programs. Research is needed to serve as a basis for establishing program priorities and to throw light on cost-benefit relationships in order to provide development planners with a yardstick for evaluating the economic value of nutrition programs.

Problem areas of interest include:

- 1. Refining preliminary findings on the effects of malnutrition on behavioral development in the child.**
- 2. Determining optimum diets for the pregnant and lactating woman and weanling child.**
- 3. Developing fast, accurate, and inexpensive nutrition and dietary survey techniques that can be employed in population surveillance programs.**
- 4. Studying the intricate relationships among health, population growth, cognitive development, and malnutrition.**
- 5. Determining the relationships between water and food-borne enteric diseases and the utilization of nutrients.**
- 6. Determining the nutrient requirement under stress conditions, such as natural disasters.**
- 7. Determining relationships between nutrition and socio-cultural factors in improving health-nutrition status.**

C. Health

Interest has focused on key health problems which inhibit development. These are:

1. Improved methods of health planning in developing countries, including mechanisms for analyzing the relationship of health programs to development goals. Research is needed to:
 - (a) Analyze and evaluate costs and impacts of alternative ways to improve health including managerial and administrative concerns;
 - (b) Identify the social, environmental, and economic determinants of health;
 - (c) Study the relationships between health and other sectors of the economy; and
 - (d) Study of existing methods and development of new methods to change family sanitary and health seeking behavior.
2. Innovative systems of delivery which are capable of serving as an effective channel through which health, family planning, and nutrition services can reach a majority of the population at a cost they and their government can afford. A continuing need exists for development and testing of methodologies for manpower development; integrating health; family planning, nutrition, and other services; utilization of indigenous traditional resources; administrative, technical, and operational communications (including effective health education); community participation, including decision making, and sharing of financial and human resources; and evaluation of outreach coverage, impact, and cost-effectiveness.
3. A continuing need also exists for research in technology and methodology for providing and maintaining low-cost potable water supplies, excreta disposal, solid waste disposal, and food hygiene arrangements in rural areas.
4. Understand the relationship between enteric diseases and other intestinal malfunctioning and human growth and development.
5. Techniques for control of vector-borne tropical diseases (particularly, malaria, onchocerciasis, schistosomiasis) through application of environmentally acceptable measures which are ecologically safe, economically justifiable, and effective. Research efforts are also focused on the development of malaria vaccine and various associated immunological problems.

D. Population and Family Planning

Developing countries requesting assistance for their population problems and programs place primary emphasis on making family planning services freely available on a voluntary basis. Consequently, the program of population research has as its main foci the development of new knowledge and methods which contribute to the efficiency and success of voluntary family planning action programs, and the development of new knowledge upon which to base population policies.

Four broad areas of population research have been identified as particularly pertinent to the solution of population problems in developing countries.

1. *Descriptive demography*—new methods for obtaining and analyzing accurate and representative demographic information in developing countries, especially the roles and status of women and the new opportunities for them as a result of reduced family size.
2. *Population policy research*—studies of development policy and planning issues dealing with the determinants and consequents of population growth.
3. *Operational research*—studies to determine the optimal organization and administration of family planning action programs and systems in developing countries.
4. *Improved methods of fertility regulation*—development of new contraceptive techniques adapted to developing country requirements and distribution systems.

E. Education and Human Resources Development

Research in the field of education may include educational planning and methods of analysis; the application and improvement of educational technology; financing of education; the role of higher education in national development; nonformal education for out-of-school populations; new techniques of organizing, administering, and evaluating human resources development programs, and the improved understanding of the relationship of education to the achievement of other national objectives, particularly as they relate to the poor.

1. Non-Formal Education

A.I.D. research interests in non-formal education (NFE) are based on the belief that NFE modes have promise as a means of delivering education relevant to the development needs of a wide spectrum of the populations of the developing world. Critical areas of need center on: relative costs and benefits of various modes of NFE, new possibilities for funding sources, administrative arrangements for central support of services for NFE programs, means of promoting real responsibility for programs, determination of appropriate content and methods for adult NFE programs to support rural development, problems of providing effective education for hard-to-reach groups' (women, the illiterate, and rural adults), and the learning phenomena of non-formal modes. A systematic knowledge base is beginning to be formed. Increasing attention is being given to research relative to the implementation of programs.

2. Educational Technology

Significant strides have been taken in recent years in utilizing the new educational technologies to effect major educational improvement in the developing nations. Both the instructional delivery systems of radio, television, low-cost print, etc., and the methodologies of instructional systems development hold further promise.

Research and development are needed to help develop lower-cost and more efficient learning systems for providing practical information and education, particularly for rural areas. Applications include:

- (a) reform and expansion of rural primary and junior secondary school systems at low unit cost, including both direct instruction and in-service teacher training, with a focus on the use of radio;
- (b) provision of educational opportunities through systematic use of media in non-formal settings; and
- (c) provisions of information and skills training to rural families in support of programs involving behavioral changes in agriculture, health, nutrition, and rural development.

Work in this area has emphasized improvement in the learning process, whether in formal or non-formal settings. Economic pressures have increased to find ways to employ the mass media, particularly broadcasting, more effectively, but this emphasis has not diminished the importance of other delivery means, including the interactive process of learner and teacher. Effective mass communications require careful integration of all aspects of the total instructional system.

New emphasis is placed on utilization of advanced communication technologies, including satellite linkages, for assistance in a broad range of development efforts. Studies will include communications policy and strategies in selected developing countries, regional centers for software development and training, and communications demonstrations involving telephone, two-way radio, television, and satellite applications.

3. Educational Analysis, Planning, and Management

Activities in this field emphasize the development of better analytical processes and methodologies by which the needs of learners can be better assessed, and learning programs designed to meet such needs more effectively. Emphasis throughout is on the production of approaches that developing country practitioners can put into immediate use. Future research will be directed to providing better understanding of the costs of educational technology and non-formal education, the educational implications of other sector development-related initiatives, and the more effective utilization of planning and analysis tools.

4. Higher Education

Higher education is perceived as being one of the main engines of development. Higher education institutions are envisioned as responsible

- (a) for training leadership in all technical professional fields;
- (b) for seeking, through research, new knowledge which will aid greatly in solving the major problems relating to development; and
- (c) for serving the masses by creating and maintaining arteries of communication in the form of services which reach outward to the national boundaries and throughout the population, particularly to the disadvantaged groups.

During the past quarter century A.I.D. has invested extensively in higher education institution building in developing nations. Now the emphasis is focused sharply on helping these institutions to develop effective problem-oriented service programs.

To facilitate the problem-solving and public service orientation of developing countries' higher education, A.I.D. will support experimental programs that build linkages with American higher education institutions. The nature and extent of the engagement of American higher education institutions with real-life problems in our society suggest that they have much to offer developing country universities in their struggle to assume effective roles in national development.

5. Effectiveness of Training Foreign Nationals

Research is needed which will provide systematic information on the impact of the various elements of A.I.D.-funded training of developing country nationals. We need to know, for example, about the nature and extent of that training which is most relevant and useful, such as: improving facilities for recruiting candidates for training; their preparation/orientation and placement; kinds of training—both academic and non-academic—that are most pertinent; best utilization of competencies achieved; priority manpower needs; how to increase the involvement of women in development activities through training; leadership and management skills required to improve manpower development; political and economic advantages of the U.S. involvement in training developing country nationals; in-country and third country training resources.

F. Economic Development and Income Distribution Problems

A.I.D. gives increasing emphasis to economic and social research which clarifies ways to encourage a broadly participatory process of growth and which emphasizes rapid reduction in poverty. In this context multi-disciplinary research that addresses the interrelationships among increased production, broadly based increases in employment and income, the facilitating and ultimate value of improved education, health, nutrition, and family planning are encouraged.

1. Income Distribution

This is an issue of growing concern in developing countries, particularly as population growth and unemployment inhibit the spread of production gains, even when considerable, over the population as a whole. Research is needed on the following:

- (a) The primary influences on decision makers in choosing developing policies, with attendant implications for income distribution;
- (b) The interrelationships among productivity and income on the one hand and education, health, nutrition, and family size on the other hand;
- (c) The effects of alternative rural development strategies and modernization programs on income distribution within the rural areas; and
- (d) Relationships between various forms of socio-political organization and the patterns of distribution.

2. *Employment Issues*

There is little empirical evidence on how developing country individuals or families who are underemployed or unemployed find the work and incomes that enable them to survive.

Labor utilization measures and concepts, by which work status and income level can be ascertained and meaningfully related to policy, are essential for improving our understanding of labor market processes.

Research to explain such individual and household responses as migration and labor supply decisions to the changing economic and social environment is also important in developing bases for sound policy formulation.

Interdisciplinary research aimed at identification of feasible interventions and labor market policy variables is especially important.

3. *International Trade and Finance*

In the area of international trade and finance, A.I.D. selectively encourages research that has clear implications for accelerating developing country economic growth, increasing export earning capacity, and for improving exchange rate and reserve management policies. The research should be firmly grounded in economic theory, should stress an empirical approach, and should be designed to serve as an input for policy formulation. Areas in which further research is particularly needed fall into two broad categories: the impact of developing country and industrial country *trade policy* on developing country exports and on developing country economic development generally, and the implication of the operations of the *international monetary system* for developing countries' economies.

(a) *Trade policy*—The impact of commodity trade, trade policies, institutional developments, changing trade relationships, trade fluctuations, etc., on the overall economic development of commodity exporting countries, including investment levels, resource allocations, employment levels, and income distribution is needed.

(b) *International Finance and Monetary Arrangements*—Analysis of the impact of major changes in the nature and functioning of the international monetary and financial systems on the development prospects of the developing countries is needed.

G. Institutional and Social Aspects of Development (Title IX)

We need better understanding of how development assistance can support democratic, social, and political trends. Much more needs to be known about ways in which developing countries can design and implement (and aid donor agencies can support) development strategies, programs, and projects that (a) recognize the differing needs, desires, and capacities of the local people; (b) promote the use of local intellectual resources and the development of indigenous institutions that meet the particular requirements of the local people for sustained economic and social progress; and (c) reinforce effective participation in governmental and political processes essential to self-government.

1. How can social science insights and knowledge be brought to bear in planning and evaluating economic development activities?
2. What social and cultural factors should be considered in connection with programs aimed at increasing employment and improving income distribution and how can they be integrated into program planning and analysis?
3. What are the effects of ethnic and language differences on participation in, and on the distribution of the benefits of economic development?
4. How can the public effectively participate in the design of economic strategies, programs, and projects?

H. Development Administration

The research program in development administration is concerned with strategy and methods of increasing the level and numbers of managerial and institutional capacities of developing countries to carry out their development policies, plans, and programs. A prime purpose is to discover means of enhancing the developing country capability to manage and utilize scarce resources designed to support their development objectives.

A major area of need is the improvement of developing country management performance in the priority areas of rural development, agriculture, health, education, and family planning. Within these sectors two key problems are:

1. Means to strengthen managerial capacity at all levels, to administer development projects and programs, and to effectively deliver resources to local population; and
2. Capacity for local action, particularly the improvement of the ability of disadvantaged elements of the society to obtain and beneficially utilize development resources. Additional areas of interest include the adaptation of modern management concepts to suit the conditions and constraints of the developing countries, activation and implementation of national aggregate and sector development plans, and problems of program resource management.

I. Rural Development

A.I.D.'s program is strongly oriented toward alleviating the problems of the rural poor. Among the wide range of research opportunities in the rural development area, specific emphases include:

1. The participation of the rural poor in the development process: organizations, institutions, and their relationships to the rural poor; the incidence of benefits and burdens of projects and policies on the rural poor; characteristics of beneficiary groups and their behavior as it affects policy and project interventions.
2. Understanding the rural development environment; development of new and more effective methods of data gathering; analysis of rural development problems with special emphasis on problems of project formulation, development, implementation, evaluation, and information systems.

3. Critical problems in rural development systems: the dynamics of the interaction of the various component elements of rural development including technology, organizations and institutions, rural financial markets, land tenure and related water rights problems, spatial aspects of rural development, rural works, off-farm employment generation, and linkages between farm, village, and urban centers.

A multidisciplinary, inter-sectoral approach (rather than purely agricultural or economic research) is needed to address the problem of rural and regional development. For example, given the disturbing trends in rural population growth, food production, ecological deterioration, and higher energy costs, what alternative programs and policies might be encouraged by governments to improve the quality of life of rural populations? What is the optimum mix and sequence of investment in social and economic activities that will induce a reversal of these disturbing trends? What structural and economic policy changes must precede or accompany investment in rural areas if the returns to that investment are to be maximized? What sorts of indicators are needed to measure returns of various types of investment and to various groups of beneficiaries (especially the rural landless)? How can groups be defined most usefully for analytical and program purposes? What are the most appropriate catalysts for facilitating the organization of rural groups, and what policies would encourage rural development at a more rapid pace? What non-farm activities and technologies should be encouraged to create rural employment, to promote higher productivity of small producers, and to reduce the rate of rural-urban migration? A.I.D. research in this area as in others should heavily involve developing country researchers and research institutions and be consonant with their interests.

J. Urban Development

Growing concern with the problems resulting from rapid urbanization in developing countries increases our need for improved understanding and approaches with which to guide and control the urbanization process, address its problems, and exploit its opportunities. Present efforts in A.I.D. look at urban development from the standpoint of:

1. its role in national development;
2. the problems of urban poverty; and
3. the linkages between urban and rural development.

The approach is multidisciplinary, cutting across sectors and subsectors. It is concerned both with the functioning and problems of the urban center *per se* and with its relationships to other urban centers and to the development of the surrounding region. Consequently, there are broad areas of research need including:

1. The location and use of urban functions in support of rural and regional development.
2. Development of employment opportunities and increased productivity for the urban poor.
3. The provision of basic services for the urban poor, including health, education, nutrition, and shelter.
4. Approaches to urban finance and administration that are innovative but practical.
5. Approaches to community, urban, and regional planning and analysis that are innovative but practical and seek to involve the poor in the planning process.
6. Increased understanding of the process of urbanization and urban development, including migration and fertility patterns, poverty differentials, and improved identification of points of intervention.
7. The development of cleaner, cheaper, and more resource-conserving approaches to urbanization, the human habitat, and employment.

K. Women in Development

Women's contributions to and benefits from economic progress are not well-recorded. Aggregate data used in development design may not distinguish between the sexes nor demonstrate qualitative differences of opportunities for women and men to participate in the development process. Existing data may reflect the numbers of women or girls enrolled in schools but not the differences in types or quality of education provided, nor potentials and constraints for use of education in obtaining employment, career advancement, or pursuing individual talents. Nor does existing data generally reflect women's de facto ownership or farm and family management, credit or loan opportunities, or the unpaid, paid-in-kind, or volunteer work of women. Such lack of appropriate data in any sector can lead to misdiagnosis of problem areas and use of approaches in development schemes which can have adverse impact on women.

The Agency's interest goes well beyond documentation of women's work, status, and/or legal or practiced codes of social/cultural tradition. The most significant and useful research is that which provides appropriate male-female comparisons in relationship to national economies and socio-economic demands upon governments. Current research includes testing a model for data collection/analysis, using selected countries in three regions; program evaluation techniques; assessment of country-specific information on a sector basis; and project-related surveys and research. Inclusion of information/data on women is required for social soundness analysis and impact statements for all A.I.D. activities.

Preferred research includes: evaluative data collection demonstrating differentials between the sexes and age groups; relationship of collections to national statistics; involvement of and support by local institutions and researchers; use of local networks for feed-back and evaluation, and potential impact of generated data (current and future) on design of development programs.

L. Physical and Engineering Sciences and Technology

Increased importance is being given to the use and management of technology in development and to its transfer from the developed to the developing countries. A.I.D.'s interests in the many aspects of this broad field include:

1. Industrial Technology

Almost every developing country has growing aspirations in the field of industrialization. The approaches range from upgrading primitive artisan industries in the least developed areas to establishment of modern industrial complexes. The desire to conserve and to earn foreign exchange is already a powerful motivation toward industrialization in many countries.

Research areas of principal concern include:

(a) Analyses of the impact of national economic and industrialization policies on;

(1) the introduction and diffusion of technology;

(2) the contribution of the activities of multinational corporations to development of technological infrastructures; and

(3) the development of national industrial research activities.

(b) Laboratory and field research to adopt specific existing techniques and technologies to the socio-economic conditions of developing countries with particular emphasis on employment, modernization of agriculture, use of indigenous resources, reduced energy inputs, and minimal capital costs.

(c) Research to develop new techniques and technologies which can contribute to overcoming bottleneck problems in the small industry for employment generation and economic advancement of rural areas.

The increasing number of research and related institutions in developing countries with interests and growing competence in this field provides new opportunities for collaborative efforts. Thus, the activities should, to the fullest extent possible, involve active participation of these institutions and their personnel.

2. Appropriate Technology

There is a great need for research on technology appropriate to the needs of developing countries. Such technology will be characterized by the use of local materials and labor in construction and fabrication, simplicity of operation, maintenance and repair, low cost, and ease of replication in the country.

Examples of such technology are many. Small-scale farm machinery would assist in increasing food production. Inexpensive, labor-intensive manufacturing processes would create jobs and build industrial capability. Innovative techniques in construction could improve housing, buildings, roads, water supply, sanitation, small-farm production, tools, and related equipment.

3. Use of Advanced Technology for Development

The goal of this area is the exploration of the potential of various advanced technologies in direct or indirect contribution to the solution of problems of developing countries. An example is the use of remote sensing technology for agricultural applications, human settlement planning, population estimation, and natural resource exploration. Other areas include the utilization of communication satellites and land-based systems for improving access to education or medical assistance (described more fully in the section on educational technology, page 15), the use of operations research and systems analysis for development planning, and the application of computer technology to agricultural, economic, and industrial needs.

4. Exchange and Transfer of Technical Information

Techniques for the effective exchange of technical information pose a problem of continuing interest. Current activities include improving access to technical literature available in the U.S., assisting the developing countries to establish procedures and standards related to technical development, and training the management personnel of industrial research institutes. Studies related to these activities or concerned with the methodologies of technology transfer would be especially appropriate.

5. *Science and Technology Policy*

An improved infrastructure for more effective utilization of scarce scientific and technological resources is rapidly being recognized as an area of priority concern in many developing countries. Of particular interest is the development at the national level of science, technology, and related research priorities, policies, and organizational responsibilities, and strengthening institutional capabilities for implementing national decisions in this field.

At present there is only rudimentary understanding of those characteristics of the science and technology infrastructure which are appropriate for developing countries at different levels of development. As a result, neither developing countries nor development agencies have an analytical basis for determining the types and size of programs that should be undertaken to enhance the contribution of science and technology to national development or to integrate these fields with development planning. In addition, it is extremely difficult to evaluate the effectiveness of such programs or their progress in contributing to national development, since there are no baseline criteria for measuring such progress. Conceptual work is needed to clarify the characteristics of an optimal science and technological infrastructure and to develop easily understood, but credible, indicators of such characteristics.

Identification of infrastructure characteristics and methodologies for improved technological choice in setting technological policies which can best serve development goals are also needed. Some important problems are related to the coupling between research activities and development goals, criteria for balance between technology importation and research, and the vertical transfer of technology from research, through development, engineering, and economic production. Approaches designed to stimulate collaborative research efforts directed to priority development problems and involving the universities, industry, and government are particularly valuable.

M. Environment, Natural Resources, and Energy

1. Environment

The values placed on the protection and enhancement of the environment in developing countries are most often significantly different from what would be appropriate for developed countries. Survival may only be possible in some developing countries as a result of some environmental disruption. Nevertheless, development should be based on carefully prepared plans that evaluate all possible ecological effects, both positive and negative; and take into consideration alternative approaches. Research into these areas is particularly appropriate since the available technologies of large scale development are not readily translated into the developing country situation but must be designed and adapted with host government and local populace participation building upon developed country experiences.

Areas for research include:

- (a) Clarification of the tradeoffs in balancing the economic and ecological factors involved in the development and conservation of natural resources;
- (b) Techniques for an improved sociological understanding and integration of opinion and beliefs of the affected population into the project design and evaluation stages;
- (c) Improved techniques for evaluating the short-term advantages against long-term prospects of development; and
- (d) The design of environmental standards of quality such that development programs can be matched with long-term phase standards designed to protect the developing country's environment.

2. Natural Resources

Identification, development, and wise utilization of land, water, forest, mineral, and energy resources, are essential to viable development planning. In addition to the obvious importance of these natural resources in the agricultural sector, they can form the bases for industrial development as well.

Areas for research include:

- (a) Improved techniques for reducing the time and cost involved in resource identification and assessment;

- (b) Technological and methodological approaches for expanding the economic utilization of previously neglected or under-utilized resources, including energy, minerals, water, marginal lands, and forest resources; and
- (c) Techniques for increasing the value added locally to natural products.

In many of these areas the technical and socio-economic problems of operating in developing countries in the tropics and subtropics are significantly different from those of the more temperate areas. Thus, on-site investigations are a key element of research activities in the field.

3. Energy

Energy is a crucial element of economic development. The scarcity and high-cost of energy affect the progress of the developing countries in many ways. Emphasis will be placed on the optimum usage of energy resources to provide the energy needed by the poor majority whether in the cities or in the rural areas.

Research proposals concerning small-scale, decentralized energy generation include:

- (a) Cost-effective methods to provide electricity in remote areas, such as solar conversion techniques or small head hydroelectric generators;
- (b) Utilization of organic waste to produce energy, for example, methane generation or pyrolytic processes;
- (c) Inexpensive water pumping devices; and
- (d) Energy storage systems appropriate to such conversion techniques.

The systems must be suited to the conditions of the developing countries. Ideally, they should permit extensive local manufacture or assembly and should use locally available materials where feasible. Both near range and longer term solutions are important. To assure that proper account is taken of the special socio-economic, environmental, and technical situations of the regions to be assisted, it will frequently be necessary to conduct on-site investigations.

Research is also needed on energy systems as they relate to development, particularly agricultural and rural development. The broad relationships between energy and economic progress are well known, but the specific interactions in circumstances of the developing countries need a great deal of attention.

IV. PROJECT PROPOSAL

Any organization having research capabilities may present proposals to the Agency for International Development for the support of specific research projects within the scope of the Agency's program.

Informal Inquiries regarding A.I.D. research interests are welcomed.

A *preliminary, informal proposal* (original and four copies) may be submitted for comments prior to the submission of a formal proposal. The preliminary proposal should contain a *clear statement* of the following:

- A. the objective(s) of the proposed research;
- B. the significance of the work proposed in terms of A.I.D.'s mission;
- C. the likelihood of project success;
- D. the time required to accomplish the project and make the results felt; and
- E. the estimated cost of the proposed project.

The formal proposal should discuss the following:

A. *Title Page*

- 1. Legal name and address of the organization submitting the proposal;
- 2. Concise descriptive title of the project proposal (40 characters or less);
- 3. Name and title of principal investigator(s);
- 4. Date of submission and period for which the proposal is valid;
- 5. Proposal starting date and duration of the work;
- 6. Signatures of the principal investigator(s) and official(s) authorized to bind the prospective contracting organization on the original and one copy of the proposal;
- 7. Proposals involving human experimentation must include a statement similar to the following on the page bearing the signature of the authorized institutional official(s):
"Human Experimentation Plan for this proposal has been Reviewed and Approved by
.....
(institution ethics committee)
on (date)"

- 8. A statement indicating whether or not the proposal has been submitted to other sponsors, in whole or in part, and if so, to whom and when.

B. Relevance of Proposed Work to A.I.D.

1. Statement of the problem and pertinence of the proposed work to A.I.D.'s mission;
2. Potential for effective utilization of research results in developing countries worldwide and suggested extension strategies;
3. Developing country participation in proposed research;
4. A preliminary assessment of the environmental effects of the proposed experiments in relation both to the research activity itself as well as the eventuality that the research is successful and the results are applied. The assessment should include probable significant environmental effects, both adverse and beneficial; a consideration of trade-offs between short-term improvements vs. long-term environmental costs including the possibility of foreclosing future options; adverse effects which cannot be avoided and factors which may offset such adverse effects; and
5. Discussion of the possible effects of the proposed work on other specific concerns of the Agency, i.e., population growth, energy requirements, status of the poor, role of women, and human rights.

C. Scientific Aspects of Proposed Work

1. Specific objectives;
2. Rationale, assumptions, theories, and hypotheses, including the discussion of the likelihood of project success;
3. Literature review;
4. General experimental design and time phased plan-of-work over the life of the project to meet the research objective(s); and
5. Specific research methodologies and techniques.

D. Facilities and Resources

1. Assessment of institutional facilities and resources, including management considerations;
2. Personnel qualifications; and
3. Other research contracts and grants received by the principal investigator(s). List by title with sponsor, funding, and duration.

E. Budget Information and Estimates

1. Estimated total funding requested of A.I.D. for the project including annual estimates;
2. Financial contributions or cost-sharing arrangements expected from other sources in total and by categories given below; and
3. A detailed budget for the first year and the total project itemized by the following categories:
 - (a) Salaries, supported by title, list of personnel with rate of pay and percent of time devoted to project;
 - (b) Consultants, number of days and rate;
 - (c) Fringe benefits;
 - (d) Travel (U.S. and Foreign);
 - (e) Non-expendable equipment;
 - (f) Expendable supplies and equipment;
 - (g) Publication costs;
 - (h) Other direct costs including any subcontractors;
 - (i) Indirect costs; and
 - (j) Subcontracts, if any.

F. Handling of Proprietary Information

If a proposing institution considers the data contained in the proposal are of such unique or original character that they do not wish A.I.D. or the U.S. Government to use them except for evaluation purposes, they should indicate this fact in the document. Words such as the following should be used prominently near the beginning of the document:

"The technical data contained in pages of this proposal shall not be used or disclosed except for evaluation purposes." In the event a contract is awarded to the proposer by the Government, this restriction will not apply. However, this restriction will not stop the Government from utilizing similar technical data obtained from other sources.

G. Submission of Proposals

Proposals should be submitted to the Director, Inter-regional Research Staff, Technical Assistance Bureau, Agency for International Development, Washington, D.C. 20523. An original and 10 copies are required. The original and one copy are to be signed by the principal investigator and an official authorized to bind the prospective contracting organization.

V. A.I.D. POLICY FOR PROTECTION OF THE INDIVIDUAL AS A RESEARCH SUBJECT

Safeguarding the rights and welfare of human subjects involved in research supported by A.I.D. is the responsibility of the institution to which support is awarded. It is the policy of A.I.D. that no work shall be initiated under a grant, award, or contract for the support of research involving human subjects unless the research is given initial and continuing review and approval by an appropriate committee of the applicant institution. This review shall assure that:

- A. The rights and welfare of the individuals involved are adequately protected;
- B. The methods used to obtain informed consent are adequate and appropriate; and
- C. The risks and potential medical benefits of the investigation are assessed.

The institution must provide written assurance to A.I.D. that it will abide by this policy for all research involving human subjects supported by A.I.D. This assurance shall consist of a written statement of compliance with the requirements regarding initial and continuing review of research involving human subjects and a description of the institution's review committee structure, its review procedures, and the facilities and personnel available to protect the health and safety and human subjects. In addition to providing the assurance, the institution must also certify to A.I.D. for each proposal involving human subjects that its committee has reviewed and approved the proposed research before any work may be initiated.

Since the welfare of the subject is a matter of concern to A.I.D. as well as to the institution, A.I.D. advisory groups, consultants, and staff may independently review all research involving human subjects, and prohibit research which presents unacceptable hazards. This provision, however, shall not derogate in any manner from the responsibility of the institution set forth herein.

All of the above provisions apply to any research involving human subjects conducted outside the United States, and in addition such overseas research will conform to legal and other requirements governing human research in the country where it is conducted.

In addition to the procedures set forth above, studies with unmarketed drugs will be carried out in compliance with provisions applicable to such studies in the country where such studies are conducted. In the United States, the regulations of the Food and Drug Administration will be followed and evidence of such compliance provided to A.I.D.

Guidance on procedures to safeguard human subjects involved in research is found in the Provisions of Part 46 of Title 45 of the Code of Federal Regulations as published in 39 Federal Register 18914 on May 30, 1974.