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A STRATEGY FOR A.I.D. SUPPORT OF SOCIAL RESEARCH AND EXPERIMENTATION ON DETERMINANTS OF FERTILITY

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I. INTRODUCTION

This paper represents the conclusion of the first phase of a process initiated late in 1973 to define a strategy and agenda for the support of social science research and experimentation* by A.I.D.'s population program. The process within which this paper is presented began with a realization on the part of the Bureau for Population and Humanitarian Assistance that A.I.D. support of social research lacked a unifying framework or program-related rationale at the Washington level. Rather, we have often seemed to be spending money for the investigation of "interesting questions" without specifying why the answers to those questions might be of programmatic importance. Another way of characterizing this situation is to say that we have sometimes assumed a passive stance vis a vis the social science research community; we have let it define what was important rather than giving strong direction to researchers using Title X funds.

This is not to say that A.I.D. has not played an important role in the past in stimulating and giving direction in many areas of social research. Indeed, much of the research on the relationship between infant mortality and fertility, on evaluation of the demographic impact of family planning programs, on experiments in the improved delivery of family planning services, and in many other areas has been stimulated by A.I.D. at both the Washington and Mission levels. This paper does not purport, then, to set out in new directions nor does it seek to denigrate the already impressive record of A.I.D.

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*. Throughout this paper we use the term "social research" to mean both pure research and pilot or demonstration projects designed to test hypotheses about the efficacy of family planning programs and socio-economic conditions which may affect fertility behavior. The reader should be aware that when we use the term "social research", we are referring to both observational and interventionist methodologies.

in the support of social science research. Rather, our intention is to step back after five years' or more experience as the largest source of support for social science research on population issues of the developing countries to see where we stand, to review what we have learned, and to suggest some areas in which a renewed effort is indicated.*

At the outset, it was clear that we needed a basic summary of where we stand with respect to knowledge about the social determinants of fertility and the impact of family planning programs on fertility. The Office of Population commissioned the Interdisciplinary Communications Program of the Smithsonian Institution to prepare a report on the state of present knowledge about these two major areas of social research and to identify major gaps in our understanding--gaps which need to be filled by additional research. The Smithsonian's report, entitled "The Policy Relevance of Recent Social Research on Fertility," has been completed. It serves very well, we believe, as a current assessment of what we know and what more we need to know in these areas of social research. It was used as the basis for the preparation of this more specific identification of key research issues and strategies.

PHA/POP's intention in this paper is to stimulate a series of dialogues within A.I.D., and between A.I.D. and all of our collaborators in the population field, directed toward achieving a practical consensus on what additional social research needs to be done in the population field and how responsibility for its execution can best be allocated among and between the various agencies and organizations concerned with the issues raised here.

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* Space does not permit a complete review of A.I.D.-supported social science research on population. However, PHA/POP's annual volume, "Population Research Sponsored by the Agency for International Development," provides a comprehensive summary.

Definition of the Boundaries of This Undertaking

Social research in the population field covers a vast area. Therefore, it is important at the outset to specify those issue areas with which we are not concerned here. We are not dealing with research concerned with any other dependent variable than fertility. Therefore, research which seeks to explain variations in mortality, migration, or population composition is not covered by this paper. It is widely believed that these other demographic variables do, themselves, affect fertility and in that sense we are interested in research which examines such relationships. However, the overriding concern is with fertility and how to lower it.

Second, this paper does not concern itself with the consequences of population change. While A.I.D. recognizes the importance of learning more about the impact of population change on various aspects of economy and society, we also believe that research needs in this area are well understood by the research community and that further refinement of A.I.D. strategy and priorities in this area is not presently required.

Third, inasmuch as we are fundamentally concerned here with research on the determinants of fertility (including the extent to which family planning programs determine fertility), we are specifically concerned with research which examines the relationships among variables which are particularly amenable to control by the instruments of public policy in the short run. In other words, the independent variables in any study must be variables over which policy-makers have at least potential short-run control, either directly or indirectly.

This paper does not directly address the subject of data-gathering. There is virtual consensus among donors and researchers alike that the data

base for social research on fertility in the developing countries is woefully inadequate. (Indeed, the data base for almost any statistical research in the developing countries is extremely weak.) For this reason, A.I.D. and all other major donor agencies have spent considerable sums of money in the past in an effort to improve the quality and quantity of statistics available to researchers and program administrators concerned with population matters. In this paper, it is taken as a given that continued improvement of social and demographic data is a sine qua non of almost all the research which this paper advocates. However, we feel that this is not the place to discuss in detail the simple gathering of data or to exhort donors, host governments, or researchers to continue to strive for the improvement of data. We are concerned here with the research questions for which improved data are required. In many instances the research questions discussed below beg the question of where the data required for their answers exist. A large part of many of the research undertakings implied by those questions must perforce involve extensive data collection.

A Question-Based, Hierarchical Strategy

This paper is organized around research questions. The questions are arranged hierarchically; that is, we begin with the most general questions and then attempt to disaggregate those questions into more and more specific subquestions of particular importance for improving the effectiveness of population and family planning program planning and implementation. Throughout the paper, the emphasis is on the short term. This reflects both A.I.D.'s perception of the immediacy of the population problem and the fact that A.I.D. is an agency whose mandate requires shorter- rather than longer-term perspective on problem-solving. We fully recognize that much needed research is precluded by this shorter time horizon, but we are confident that several

other donor agencies, including the private foundations, are better prepared and organized than we are to commit themselves to longer-term research enterprises.

Finally, all of the questions posed here must be viewed from the perspective of specific countries. While it is certain that many of the relationships identified below are consistent across countries, A.I.D. is convinced that only if the research is carried out for the benefit of policy-makers and program administrators in each country will they be likely to act upon the findings. Consistent with this general observation is the further belief that indigenous investigators must be prominent in the research enterprise. To the extent that local researchers do not have the competence to carry out some of the research suggested below, we believe that they still must be involved, as circumstances permit, with outside collaborators in the execution of the research.

II. A HIERARCHY OF QUESTIONS FOR SOCIAL RESEARCH AND EXPERIMENTATION

The Smithsonian study, "The Policy Relevance of Recent Social Research on Fertility," argued persuasively that "the overarching problem in population policy is now to turn public objectives into private action." The authors go on to point out that extant research has shown that private actions are influenced by a plethora of public actions, some intended to bring about a change in private fertility behavior, others intended to achieve different outcomes but having an impact on fertility nonetheless. The Smithsonian report emphasizes that the central need of any policy-maker who is concerned with changing fertility behavior is knowledge about the cost-effectiveness of alternative policies or programs he might undertake. How much of a change in the fertility rate is likely to result from various different kinds of

inputs, financial and otherwise? To what extent is a given expenditure in family planning* likely to affect fertility compared with an equal expenditure in education? What is the likely fertility consequence of a given expenditure for secondary and higher education as opposed to primary education? What would be the consequence for fertility of a given investment to reduce infant and child mortality compared with the fertility consequences of an equal investment in expanded family planning delivery systems? These are the sorts of questions with which policy-makers and program administrators must wrestle every day. They are equally pertinent to donors in the development assistance field since they should influence not only the ways in which we program funds but also the form which our advice to recipients takes. Accordingly, the questions and discussions below are based upon the conviction that social research on fertility is most useful to the extent that it helps decision-makers determine the most effective allocation of limited resources among alternative uses in reducing fertility.

We begin, then, with the most basic question of all:

1. All other things being equal (i.e., holding all other variables constant), how much of the observed variation in fertility** can be directly attributed to family planning program activities and how much can be attributed to variables other than family planning?

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* Throughout this paper the term "family planning" is used to connote both formal programs and other activities which make possible the use of modern forms of contraception, such as commercial distribution of contraceptives.

** There are several different operational definitions of fertility presently in use. In this paper we subscribe to no single definition, preferring to use the term in its most general sense. However, we are very much aware of the need for researchers to adopt standard operational definitions of this concept.

Discussion: In a number of countries for which we now have reasonably good demographic statistical data, fertility has declined in statistically significant measure over the past decade (e.g., Taiwan, Korea, Costa Rica, Chile, Mauritius). Many of these countries (including those just listed) had active family planning programs in force during at least part of the period during which fertility declined.

- To what extent can one explain the decline in fertility in terms of the existence of the programs, and to what extent have other variables been responsible for the decline?
- Or, alternatively, if the programs had not existed at all, by what percentage would fertility have declined, if at all, during the period of observation?
- What other variables have been most closely associated with the decline of fertily?
- To the extent that the contribution of family planning programs to fertility has been different in different countries, what explains the relatively different impact of the programs? (For example, it is widely believed that the changes in Mauritius were closely related to the existence of the program while in Chile and Costa Rica many observers have been inclined to discount the contribution of the program.)

The obvious rationale for research on the questions posed above is to identify those factors which, under vastly different socio-economic circumstances, contributed most directly and importantly to fertility decline in order to isolate those variables to which decision-makers and program administrators in different countries (including the donor countries and agencies) can most profitably direct their attention.

However, the answers to the questions posed above are not enough. It is equally important for policy-makers and administrators to know what alternative uses of funds designated for fertility reduction might be.

- To what extent could the countries listed above have used their relatively meager population program funds in even more fertility-influencing ways?
- Would a diversion of funds from family planning programs to other uses such as education or employment have resulted in a higher or a lower rate of fertility decline?
- If higher, which other uses of the funds would have had the greatest impact on fertility?
- If lower, could family planning programs have been structured in a way that would have increased their fertility-reducing impact?
- Without any change in the funds applied to family planning programs, what changes in the volume or uses of other development funds might have resulted in lower fertility?

We believe that the answers to questions such as these have implications far beyond the countries in which they are studied. Obviously these cases are mentioned because they represent places in which such questions can be studied. However, the selection of these countries is not meant to imply that the research ought to be carried out only there or that the answers are meant to apply only to those countries. On the contrary, because these countries have succeeded in lowering fertility, to some extent they are of lower priority for future action. But, by the same token, because fertility has declined in these countries and because, in some respects, these countries are not atypical of other LDCs, there are lessons to be learned in these countries that have

clear and important implications for countries in which fertility has not declined and where family planning programs are either weak or nonexistent.

Finally, we should note the importance of carrying out research on the questions posed above in different regions of some of those countries which have experienced recent and relatively rapid fertility decline.

- To what extent has there been regional variation (e.g., urban vs. rural, largeholding vs. smallholding) in fertility rates?
- To what factors are such variations attributable?
- Are different mixes of inputs appropriate to different socio-economic environments?
- If so, what kinds of family-planning/other-than-family-planning mixes are most appropriate to the different environments? (For example, is it possible that family planning services ought to be emphasized in urban environments while other-than-family-planning investments ought to be emphasized in certain kinds of rural environments?)

2. <u>What can be done to increase the demographic impact of family planning programs?</u>

<u>Discussion</u>: This second major question assumes that certain basic answers have been given for the first question, i.e., between family planning and other investments, where should policy-makers place the emphasis in their attempts to lower fertility? Assuming, then, that in many situations, policy-makers will continue to opt for the provision of family planning services for the purpose of lowering fertility, it is important to learn more about the factors which influence the relative impact of family planning programs.

There are three basic aspects of family planning programs to which social research is especially relevant: a) the characteristics of the target

population; b) the nature and administration of programs; and c) the impact of family planning communication on motivation to accept family planning.

Characteristics of the target population

- Who is using the program and who is not? This is a basic question for which the answer is all too seldom known.
- What are the characteristics of acceptors of family planning services and what are the characteristics of those who do not use such services?
- What can be inferred from knowledge of these characteristics about the reasons for acceptance or non-acceptance?
- Where services are available and widely advertised, why do non-users abstain? A good deal of survey research has been done on these questions, but very little anthropological or participant observation research has occurred. From KAP surveys we know a good deal about what people say about the reasons they do or do not use family planning services, but very little research has been done to attempt to verify those responses to quickly administered questionnaires. The methodology of the anthropologist--that of immersing himself in the life of a small community--is necessary to probe behind the questionnaires--to try to learn the "real" reasons, especially for non-acceptance. Until we learn more about individual motivation and about people's perceptions of the circumstances within which family planning is offered, it will be difficult to prescribe improvements in the ways in which family planning programs are structured or their services advertised. Below we discuss in greater detail needed research on motivation regarding birth spacing and family size. In this section on family planning research, we are especially concerned with gaining more insight into the clinic environment and how it affects the people it is organized to serve. In countries such as the Philippines and Indonesia,

where full-scale family planning programs have been created to lower fertility, it is more important to learn more about why some clinics are successful and some seem to fail; why services offered by some forms of clinic organization are readily accepted while services offered by other forms of organization are resisted.

Another series of questions regarding the characteristics of the target population have to do with their fertility.

- Apart from the question of why some people accept family planning services and others do not, it is important to know what the fertility of acceptors is in comparison with the fertility of non-acceptors.
- If one controls for socio-economic status and various other characteristics of the target population, can one observe a statistically significant difference between the completed fertility of family planning acceptors and non-acceptors? (Obviously, many non-acceptors with low fertility are using some form of birth control. We are referring here to acceptance of services offered by an official or private family planning program.)
- In other words, do people with the same level of education, same income, same type of employment, same organization of the household, etc., have different levels of completed fertility depending on whether or not they utilize the services of family planning programs? Not much research has been done on this question, yet it has obvious implications for program administrators and policy-makers alike. For the program administrator, knowledge about the demographic impact of the program is essential to seeking ways of improving outreach and continuation rates. For the policy-maker, such knowledge has clear implications for how he decides to allocate resources between family planning program activities and other activities which have the effect of lowering fertility.

The Nature and Administration of Family Planning Programs (Operations Research

Assuming, then, that family planning programs do have an impact on fertility (and the Smithsonian review demonstrates that previous research indicates that they do), it is of particular importance to know which types of programs have the greatest impact, under what circumstances, and in terms of cost-effectiveness. Classifying family planning programs by type can be done according to various dimensions. One can classify programs according to services offered, according to basis of organization (i.e., clinical vs. non-clinical or health-based vs. free-standing), according to nature of program staffs (medical vs. paramedical, use of motivators, etc.). Finally, programs can be classified according to combinations of these dimensions (e.g., clinical and nonclinical provision of pills and condoms within an MCH program, using medical and paramedical staff, with an IEC component, and involving motivators). It is useful to measure program impact according to all of these dimensions, but of cardinal importance seem to be a) whether family planning programs which are integrated into the existing health infrastructure are more or less effective than programs which are free-standing; and b) the extent to which the services offered by the programs are determinative of their impact on fertility.

In Table I, we have presented some of the types of components or variables one has to consider when assessing program performance. The lists are not comprehensive but are presented for illustrative purposes. The table shows that holding various components constant is an extremely difficult and expensive undertaking, especially when one considers that the table does not

TABLE I: ANALYTICAL COMPONENTS OF FAMILY PLANNING PROGRAMS

A. Fertility Regulation Methods

A_1 TYPE
- a. Pill
- b. IUD
- c. Condom
- d. Sterilization
- e. Abortion
- f. Other

A_2 CHARACTERISTICS
- a. Brand or Procedure
- b. Amount per visit
- c. Eligibility Criteria
- d. Cost
- e. Inventory

B. Staff Composition

B_1 TYPE
- a. Medical
- b. Para-Medical
- c. Non-Medical

B_2 CHARACTERISTICS
- a. Sex
- b. Education
- c. Ethnicity
- d. Salaries
- e. Etc.

B_3 FUNCTION
- a. Supervisory
- b. Administrative
- c. Motivational
- d. Service
- e. Percent Family Planning Oriented
- f. Percent Non-Family Planning Oriented

B_4 DEGREE OF EFFORT
- a. Time per function
- b. "Down time"*
- c. Clients served

B_5 QUALITY
- a. Complication rate for IUD, sterilization, & abortion procedures
- b. Staff turnover
  Adequacy & Accuracy of Client Records
- c. Attitude toward and treatment of clients, Quality of Prior training.

*Non-productive time, e.g., no clients at clinic

C. Delivery Mechanism

C_1 TYPE
- a. Static Clinic
- b. Mobile Clinic
- c. Retail Outlets
- d. Family Planning Agents

C_2 CHARACTERISTICS
- a. Non-Family Planning Functions
- b. Physical Size
  - i. square meters
  - ii. area by function
  - iii. area by utilization
  - iv. cost per meter
- c. Equipment
  - i. age
  - ii. cost
  - iii. utilization
  - iv. maintenance cost
- d. Accessibility
  - i. geographical area served
  - ii. population served
  - iii. access roads
  - iv. travel time
  - v. hours opened
- e. For C_1 c
  - B_2
- f. For C_1 d
  - B_2
  - B_3
  - B_4

D. Information, Education, Communication

D_1 TYPE (MEDIUM)
- a. Radio
- b. Handbills
- c. Posters
- d. Movies
- f. Mailings
- g. Agents

D_2 CHARACTERISTICS
- a. Content
  - i. Economic Benefits
  - ii. Availability of Services
  - iii. Info. on Methods
  - iv. Child Spacing
  - v. Aspirations for self and children
- b. Cost
- c. Distribution/Airings
- d. Areas Covered
- e. Population exposed
- f. For D_1 g
  - i. B_2
  - ii. B_3
  - iii. B_4

E. Incentives

E_1 TYPE
- a. No-Birth
- b. Acceptor

E_2 CHARACTERISTICS
- a. Recipients
  - i. individuals
  - ii. group/community
- b. Criteria for Payments
  - i. Method Accepted
  - ii. Months not pregnant
  - iii. Parity of recipients
  - iv. Fertility rate group/community
  - v. etc.
- c. Payments
  - i. cash
  - ii. in-kind
- d. Schedule of Payments
  - i. immediate
  - ii. deferred
  - iii. elastic

PHA/POP/R - 9/6/74
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include nonprogram variables like the characteristics of the population served and the socio-economic setting of the clinics.

Administrators and policy-makers can improve programs based on research which is not holistic. We feel that the best approach for using research for program improvement is operations research or systems analysis in which programs are viewed as systems of interrelated activities designed to achieve a particular goal or goals. By analytically separating different parts of the program, the investigator can isolate problem areas for remedial action.

There are four key elements in this sort of operations research. These are:

(a) the development of a model which depicts the set of activities and the interrelationships among them;

(b) the development of a measure of effectiveness of the system by which one will be able to judge whether the system is progressing towards the particular goal or not;

(c) identification of the key input variables which can be manipulated to modify the system and;

(d) the application of experimentation.

While there are few programs which can readily employ an approach which depends on such sophisticated information gathering, processing, and analysis mechanisms, we feel that efforts should begin in this direction, first, with small demonstration projects which can be used to develop and show the value of such a management system; then, hopefully, the system can be expanded to a national scale.

The Impact of Communication in Family Planning Programs

Various donor and developing country governments have spent considerable sums over the past few years on programs designed to motivate people to accept

family planning services offered by national and private programs. These efforts have ranged from mass media appeals to couples to use local services to the use of local level personal communication efforts on the part of specially trained family planning "motivators." Considerable money has also been spent in trying to evaluate the effectiveness of various communication strategies in family planning. Many of these are reviewed in detail by Everett Rogers in Communication Strategies for Family Planning. In that book Rogers also poses some key questions for additional research to which PHA/POP subscribes.

- Why do parents decide to have a child, particularly the third or fourth child?
- To what extent do they decide such matters at all?

These questions obviously have implications beyond the area of family planning communication, but they are important for the formulation of communication strategies as well. Although the Fawcett, et al "value of children" study represents a major step in this direction, additional research which links Fawcett's socio-psychological variables to economic and cultural variables is necessary.

- How are family planning methods perceived as interfering with the enjoyment of sexual intercourse? One of Rogers' most important points has to do with the need to more effectively aim both the "message" and the "media" toward males. He reviews a great deal of research which indicates that male opposition to family planning is often more important than female support in determining whether or not fertility limitation will occur at the individual family level. Enjoyment of intercourse and male attitudes toward the possible interference of family planning methods with that enjoyment would seem to be an important area for additional research.

- What are the interpersonal communication networks through which family planning ideas (including rumors) diffuse among peers? It is Rogers' conclusion that individual acceptance of family planning is far more powerfully affected by peer communication than by mass media appeals, which he views as being more important at the elite level and for purposes of general awareness. Yet comparatively little research has been done on interpersonal communication networks in the diffusion of information about and motivation toward the adoption of family planning. Several A.I.D. Missions have supported research on this question, but a broader, predominantly anthropologically based research effort is needed in this area.

We would add a series of questions to which Rogers does not address himself but which the Smithsonian report suggests.

- Among the various communication strategies available to family planning program administrators, which have been the most effective in attracting "high quality" acceptors (i.e., those whose fertility declines and who continue to use the services for long periods of time)?
- Among the most effective strategies, which are the lowest in cost?
- On a cost-effectiveness basis, which strategies are the most highly recommended under various different social, cultural, economic, and political conditions both among and within countries? Among the various strategies which have been used in family planning communication, the following appear to be most worthy of continuing investigation: the use of peer "motivators" and field workers, the use of mass media appeals, the use of printed educational and motivational materials, the use of acceptor and diffuser incentives, and the use of "traditional" communication networks.

3. What can be done other than and in addition to the provision of voluntary family planning services to lower fertility?*

Discussion: This is the third and final major question to which this paper is addressed.

- How and in what degree can voluntary family planning be supported by other policy and program actions designed to induce lower fertility? Underlying this question are two very important issues. First, the question implies that the problem of population growth may be too severe for voluntary family planning alone to solve. But how severe is too severe? We believe that it is the consensus within A.I.D. that the problems generated by current rates of population growth are so serious that all steps which are politically, ethically, and culturally acceptable should be taken to lower fertility rates as much and as rapidly as possible. Second, the question implies that individual motivation for smaller families may not be sufficiently high for voluntary family planning to succeed. It asks whether voluntary programs will not invariably peak at a certain level of acceptorship after which one encounters a "hard core" (which in some countries may be extremely large) of people who have no interest in reducing their fertility.

A great deal of research has been done on the issue of motivation for fewer children and on policies which might increase such motivation. Even more ink has been spilled on proposals for policy and program action "beyond family planning" to increase "demand" for smaller families. Given the

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* The reader should be aware that this section does not imply anything about the use of Title X funds for programmatic activities other than family planning. Rather, our intention is to indicate how Title X research funds might best be used to examine fertility-influencing programs and policies which all donors and governments should consider in overall development planning and implementation.

charged and very complex environment within which the issue of motivation has been debated, we attempt in the pages which follow to avoid impressionistic rhetoric in favor of empirical questions upon whose answers action can realistically be based. One of the principal problems with the other-than-family-planning proposals is that they frequently ignore cost or the capacity of governments to implement them. Therefore, we seek here to restrict ourselves to the consideration of variables over which governments have control in the relatively short term and to which they are likely to give serious attention should research findings merit such attention.

Finally, by way of introduction, we have accepted the Smithsonian's notion that knowledge of the correlates or determinants of fertility is not enough, even if those correlates or determinants are highly amenable to government manipulation. Beyond knowlege of correlates and determinants, we need solid information on the relative cost-effectiveness of alternative proposals.

Table 5 in Chapter III of the Smithsonian report (Attachment A of this paper) summarizes recent research on 18 correlates of fertility. The table evaluates several dozen research undertakings with respect to: a) the nature of the relationship between fertility and the 18 variables (i.e., whether the relationship is positive, neutral, or negative); b) the elasticity* of fertility with respect to nine of those variables; and c) the adequacy of research on each variable. From this table it is possible to select those relationships which appear to be most promising for future investigation. The reader is referred to the report for extended discussion of what is known about each of the relationships identified. The questions below are those which

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* This term as it applies to population-influencing inputs is explained in detail in the Smithsonian report.

appear to us to be the most important for program and policy action in the relatively short term (i.e., the next five to ten years).

- Among those variables over which governments have control, other than family planning, which appear to be most powerfully related to fertility decline? The Smithsonian study concludes that some of those variables which may be most determinative of fertility decline are also those whose relationship to fertility is least well understood.

Income Distribution

Foremost among these variables is income distribution. Both cross-national and within-country longitudinal research indicate that the degree of equality of income distribution may be a powerful determinant of fertility. However, income distribution is a variable which is extremely difficult to measure,* especially in the data-poor developing countries. Nonetheless, it is a variable to which development economists throughout the world are giving increased attention, partly as a result of increasing government interest in seeking ways of improving the lot of the poorest segments of the population in many countries. We may expect, therefore, that over the next several years, data on income distribution will improve to the point that it will be possible to undertake research on the relationship between income distribution and fertility in which one can have greater confidence than is presently possible.

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* Whereas the amount of money income *per se* may be determined at an individual or household level, the equality of income distribution represents the relative position of certain income-earning *groups* (by region or occupation, for example) *vis-a-vis* other income-earning groups. Thus, the investigation of income distribution-fertility relationships will require a more comprehensive data base and more refined survey techniques than have been previously available.

Other variables which appear to be especially deserving of increased attention by researchers are female education, female employment, and infant and child mortality. Questions arising from consideration of these variables in terms of their effect on fertility are the following:

Female Education

- Why do better-educated women have fewer children?
- Is their lower fertility a result of education itself or does the relationship with fertility wash out when one controls for other variables such as age of marriage, employment, social status, income, etc.?
- What is it about the educational process (if anything) that explains the lower fertility of better-educated women and men, but especially women?
- How many girls would require how many years of formal education in order to cause fertility to decline by X amount?
- Are there alternatives to formal schooling for girls that would have the same effect as formal schooling on fertility?

Female Employment

- Is female employment always associated with lower fertility?
- If not, under what conditions is it associated with declining fertility?
- Must the employment of women take them away from their homes in order to induce fertility decline?
- Is it employment that accounts for lower fertility, or does the relationship disappear when one controls for education, income, social status, etc.?
- What is it about employment (if anything) that causes employed women to bear fewer children?
- Are there alternatives to out-of-home wage employment that would have as powerful an impact on fertility?

- What are the implications for governments of creating out-of-home wage employment opportunities for women?
- Is the creation of such opportunities in sufficient number to have a major effect on fertility feasible?
- Is such an approach to fertility limitation cost-effective compared with other investments governments could make?
- Would employment creation programs which give preference to female employment be as effective in lowering fertility as other development investments which governments could make?
- Which, if any, other investments would be as or more effective in lowering fertility per unit of expenditure?

Infant and Child Mortality

- Must infant and/or child mortality decline prior to fertility decline?
- Do people's perceptions of the probability of infant and child survival affect their fertility behavior?
- If so, how long after an increase in the probability of infant survival occurs do people's perceptions of those probabilities change accordingly?
- Can the gap between real change and perceptual change be shortened? How?
- How much of the variation in fertility decline can be accounted for by decline in infant mortality?
- How much of an investment in attempting to lower infant mortality would result in how much of a decline in fertility?
- Under what circumstances does it make sense for a government to spend resources on lowering infant and child mortality, in part for the purpose of lowering fertility, compared with other uses of the same resources

(e.g., for female employment or education programs, for family planning programs, etc.)?

In the preceding section we have identified four variables which are frequently alleged to be highly determinative of fertility rates. However, there are many other variables for which essentially the same questions could be asked. We remind the reader of what we said in Section 1. above: the policy-maker needs to know more than the strength of a relationship and more even than whether or not the variables considered are causally related. He needs to know, in the final analysis, what the most effective use of scarce resources is likely to be among the many alternative uses to which he can put them. Only analysis which is able to handle several variables simultaneously or consecutively permits an adequate understanding of the interactive effects of the variables over which the policy-maker has at least potential control. And only analysis of the costs and benefits of alternative expenditures will provide the policy-maker or program administrator with the information he needs to make a reasonable and effective decision regarding the uses of his resources for reducing fertility.

III. CONCLUSION

This paper has attempted no more than to spell out the principal questions which A.I.D. has regarding the determinants of fertility and the effectiveness of family planning programs and to explain why we believe these questions are important.

We have identified what we consider to be important questions for research on the distribution of program resources between family planning programs and other anti-natalist actions, on the improvement of family

planning program impact on fertility, and on determinants of fertility other than family planning. However, this paper has not discussed methodologies for the carrying out of either observational or experimental research in the social sciences. We have not, for example, discussed experimental research or pilot programs in incentives or in the testing of various forms of delivery of family planning services. We believe that to have done so would have been to go beyond the scope of this enterprise. We are seeking here to alert various agencies and researchers to our perception of major research questions to be ansered, not to suggest how such research should be carried out. It is the business of researchers to propose specific methodologies for the examination of the questions posed here. We recognize that those methodologies will inevitably involve both observational and experimental research.

Finally, we would reiterate a point that has been made a number of times above: it is PHA/POP's conviction that social research on fertility must ultimately concern itself with options that are real and feasible to policy-makers and program administrators. The time has come for broad-based research on variables over which policy-makers have real or potential control and on relationships which are amenable to modification in the relatively short run. Beyond that, we repeat the Smithsonian report's conviction that social research is most likely to lead to action to the extent that it "can help a government decide how to employ resources in the most efficient manner to achieve population/development objectives."

Table 5.
Summary of Findings on the Correlates of Fertility: Direction of Relationship, Averages of Elasticities, and Adequacy of Research

INDEPENDENT VARIABLE	Nature of the relationship with fertility[a]	Elasticity (computed average from studies cited)	Adequacy of research
Income and its Distribution			
Income	?	−.24[c] (6)[b]	Fair
Income Distribution	−	−.36 (1)	Poor
Socioeconomic Change			
Economic Development	?	--	Poor
Socioeconomic Status	−	--	Poor
Education and Literacy	−	−.15 (1)	Fair
Female	−	−.25 (9)	Good
Male	+ or 0	--	Fair
Employment			
Male	+ or 0	+.09[e] (1)	Fair
Female		−.19[d] (2)	Fair
Rural	+ or 0		
Urban	−		
Children	+		Poor
Value of Children			
Age at Marriage	−	--	Poor
Type of Marriage	?	--	Poor
Costs of Children and Childbearing	−	--	Fair
Son Preference	− or 0	--	Poor
Infant Mortality	+	+.33 (3)	Fair
Other Variables			
Urban/rural Differentials	0	−.11[f] (3)	Fair
Religion	0	--	Poor

NOTES:
[a](+) symbol is used if the relationship to fertility is direct, (−) symbol if the relationship to fertility is inverse, (0) symbol if there is no relationship to fertility, and (?) symbol if the relationship to fertility is indeterminant.
[b]Elasticities for per capita income and income per worker.
[b]Numbers in parentheses indicate number of elasticities found.
[c]Elasticities for male earnings.
[d]Elasticities for female earnings and female labor force participation.
[e]Elasticities for percent of population in urban areas.