



## Summary Report

### Rural Development Programs and Their Impacts on Fertility: State-of-the-Art

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# **RURAL DEVELOPMENT INTERVENTIONS AND THEIR IMPACTS ON FERTILITY**

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## **State-of-the-Art Papers**

### **Rural Development, Women's Roles and Fertility in Developing Countries: Review of the Literature**

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### **Rural Development, Education and Fertility: A State-of-the-Art**

Benjamin Cheng, William D. Lawson, and William T. Levine

### **Rural Development, Migration and Fertility: What Do We Know?**

Sally Evans Findley, James Gundlach, Douglas P. Kent, and Richard Rhoda

### **Rural Development Activities, Fertility, and the Cost and Value of Children**

Boone A. Turchi and Ellen S. Bryant

### **Rural Development, Land and Human Fertility: A State-of-the-Arts Paper**

C. Shannon Stokes, Wayne A. Schutjer, Terry L. McCoy, and Charles H. Wood

### **The Relationship of Fertility to Income and Wealth in Rural Development**

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### **Relationships of Rural Development Strategies to Health and Nutrition Status: Consequences for Fertility**

Raymond B. Isely, Laurie Zivetz, Roland Norman, and Hetty Banatte

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## FOREWORD

This report is part of a series of State-of-the-Art Papers called for under AID Project 931-1170, Rural Development and Fertility. The Project was designed to assist AID officials, overseas and in Washington, to comply with the mandate included in the 1975 Foreign Assistance Act, Section 104d. That section stipulates that "(1) Assistance ..... shall be administered so as to give particular attention to the interrelationships between (a) population growth, and (b) development and overall improvement in living standards in developing countries, and to the impact of all programs, projects, and activities on population growth. All appropriate activities proposed for financing under this chapter shall be designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families, in programs such as education in and out of school, nutrition, disease control, maternal and child health services, improvements in the status and employment of women, agricultural production, rural development and assistance to the urban poor." The amendment to the FAA continues to authorize the President "...to study the complex factors affecting population growth in developing countries and to identify factors which might motivate people to plan family size or space their children."

These papers examine the extensive literature which encompasses rural development and fertility relationships. Seven State-of-the-Art Papers (SOAPs) were produced: addressing the primary determinants of fertility. From this research base the second phase of the project will "...study the complex factors affecting population growth..." in operational settings, particularly through the medium of project implementation. Case studies will be designed to examine development in rural areas and to isolate the fertility implications of changes in the socio-economic environment. Translating the results of this investigation to decision makers in developing nations and within donor organizations is also

a primary goal of the Project. In addition to publications, a series of seminars, workshops, and intensive technical assistance in participating countries are planned as part of an outreach component of the Project.

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The views and interpretations in this publication are those of the author(s) and should not be attributed to the Agency for International Development or to any individual acting in their behalf.

The seven papers were reviewed by an independent panel of experts including:

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Dr. Cecile E. De Sweemer, Johns Hopkins University  
Dr. Rae Lesser Blumberg, University of California  
Dr. Nadia Youssef, International Center for Research on Women  
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The SQAPS reflect the comments of the review panel: however, responsibility for content rests with the authors.

## INTRODUCTION

"I know from my own painful searching, with its many blind alleys, how hard it is to take a reliable step, be it ever so small, toward the understanding of that which is truly significant." Albert Einstein

The challenges of the Rural Development and Fertility Project (AID/ta-CA-1) are indeed significant. The quest for distilling some of the key elements that underpin observed or hypothesized interrelationships that govern change in individual behaviors operating within the context of a very complex socio-economic-political and religious environment is a tremendous objective. This quest was initiated in this project by the search of what has been written on the subject at hand. This report summarizes the results of the effort to ascertain the State-of-the-Art with respect to the impact of rural development interventions on household fertility decisionmaking.

It is important to emphasize that the focus of this effort was not on rural population policy but on the demographic impact of rural development programs targeted primarily toward other objectives. Similarly, it is important to remember that the goal of fertility reduction in rural areas is, for the most part, an intermediate goal that is instrumental in achieving the primary goals of rural development policy: increased income per person, improved agricultural productivity, reduced mortality and morbidity, etc. Consequently, the majority of rural development projects are targeted toward objectives that would appear to be only tenuously related to fertility reduction.

However, any nation's rural development budget may contain severe misallocations of resources if rural development programs contain unintended fertility effects that are not included in the criteria used to select them. Since the number and scope of rural development projects are always constrained by the availability of public resources, competing projects must be compared and ranked according to some criterion or set of criteria. The objective of this comparison of projects is to

select that subset that makes the greatest contribution to development given the resources at hand.

If a capital investment project has unintended fertility consequences that are not included in the cost benefit calculations, the actual rate of return on a project might be considerably higher or lower than otherwise suspected. It is, therefore, highly desirable that the unintended consequences of rural development policy at least be considered and at best be fully understood and accounted for. The mandate to include population impact statements in AID rural development proposals is a recognition and codification of the desirability of understanding the demographic consequences of rural development policy.

The set of rural development programs actually undertaken as component parts of an overall rural development policy often affect the target population in diverse ways. Many of the programs tend to have the most direct impact upon the economic environment, affecting agricultural production technologies, financial markets, marketing and transportation systems, and the labor force. However, these programs may have secondary demographic affects that are ultimately important determinants of rural fertility patterns. In general three sets of linkages are important in understanding the connection between rural development policy and reproductive behavior: (1) the connection between specific rural development programs and the social, economic, political, and technical environment within which rural populations reside, (2) the relationship between this environment and the factors that are the immediate determinants of reproductive behavior, and (3) the connections between the salient decision factors and reproductive behavior. To understand how rural development policy affects reproductive behavior, it is necessary to understand all three linkages; however, as this review paper demonstrates, the scholarly literature on fertility in developing countries is almost totally silent with respect to the first linkage, fairly scanty with respect to the second linkage, and better but still inadequately descriptive of the third

linkage. In large part new insights will come only as new data sets are developed. The problem of assessing the population impact of rural development activities is not a short-run problem, and without explicit attempts to conduct and analyze quasi-experimental studies of actual rural development projects, our ability to assess their fertility impacts will be hampered. New research should be designed that can help development administrators and policy makers assess the demographic impact of their programs. The small cost of such studies relative to the cost of rural development projects themselves, should be ample incentive for their early initiation.

## BACKGROUND

Effective July 10, 1978, the Research Triangle Institute (RTI) and the South-East Consortium for International Development (SECID) began the process of assembling a group of professionals from within their respective member institutions to prepare seven State-of-the-Art Papers (SOAPs) that would examine the relationship of fertility and each of the following topics in the context of different types of rural development activities:

- women's roles
- the cost and value of children
- income and wealth
- land tenure systems
- educational status
- health and nutrition status
- rural-urban migration

Each SOAP included the following:

- An annotated bibliography of literature on the subject including monographs, articles, dissertation theses, and secondary sources such as abstracts of projects undertaken by U.S., LDC and other donor agencies;
- An "inventory of hypotheses" distilled from the literature;
- An analysis of the hypotheses in the context of the overall set of rural development/fertility interactions;
- An executive summary.

This volume includes the executive summaries from the seven SOAPs as well as a general analytical framework which synthesizes the major findings of the seven papers into a coherent model.

In all, 23 professionals representing disciplinary expertise in sociology, demography, political science, economics, medicine, and public health collaborated on the seven SOAPs. Over 1500 references were reviewed. The geographic and topical breakdown of these citations are tabulated in Tables 1 and 2. Much of the data were obtained from U.S. sources and included among others:

TABLE 1. Number of Citations by World Region and By Topic<sup>a)</sup>

WORLD REGION	FERTILITY <sup>b)</sup>	OTHERS	TOTAL
Latin America and Caribbean	68	220	288
Subsaharan, Africa	35	150	185
East and Southeast Asia	68	79	147
South Asia	40	87	127
Europe, United States, Canada and Australia	60	26	86
North Africa/Middle East	28	49	77
General and Other	206	473	679
TOTAL	505	1084	1589

a) This table was compiled by Dr. William P. McGreevey, Ms. Constance Carrino and Anne C. Kubisch of the Batelle Population and Development Policy Program, Washington, DC. Dr. McGreevey was one of a five-member panel of peer reviewers who evaluated the State-of-the-Art Papers.

b) Includes citations in which the word fertility or a synonym appears.

TABLE 2. Number of Citations by Country and by Population Size<sup>a)</sup>

COUNTRY	POPULATION (in 000) <sup>b)</sup>	NUMBER OF REFERENCES
China	835,800	2
India	620,440	64
Indonesia	130,887	16
Japan	112,768	3
Brazil	110,124	16
Bangladesh	80,400	22
Nigeria	77,056	30
Pakistan	71,306	16
Mexico	62,025	42
Philippines	43,293	27
Thailand	42,960	23
Turkey	40,930	13
Egypt	38,228	8
South Korea	35,860	15
Iran	33,592	8
Ethiopia	28,680	6
South Africa	26,130	4
Argentina	25,719	4
Zaire	25,389	4
Colombia	24,301	19
Morocco	17,197	8
Algeria	16,463	3
Taiwan	16,330	24
Sudan	16,127	6
Peru	16,068	20
Tanzania	15,136	10
Afghanistan	14,000	4
Kenya	13,850	5
Sri Lanka	13,819	10
Nepal	12,857	4
Malaysia	12,653	4
Venezuela	12,361	10
Uganda	11,937	2
Chile	10,375	13
Ghana	10,310	15
Cuba	9,464	1
Syria	7,655	2
Cameroon	7,606	5
Ecuador	7,306	3
Ivory Coast	7,025	2
Guatemala	6,251	8
Bolivia	5,794	9
Tunisia	5,732	5
Senegal	5,135	5
Zambia	5,063	1
Dominican Republic	4,835	4
Haiti	4,668	5
Hong Kong	4,444	5
El Salvador	4,129	4
Israel	3,460	5
Lebanon	3,266	4
Sierra Leone	3,053	8
Honduras	2,959	3
Papua New Guinea	2,829	2
Uruguay	2,800	1
Jordan	2,792	4
Paraguay	2,625	5
Nicaragua	2,338	4
Singapore	2,278	1
Jamaica	2,072	4
Costa Rica	2,018	5
Panama	1,718	2
Liberia	1,600	1
Botswana	679	2
Fiji	580	1
Gambia	531	1
Barbados	247	1
Western Samoa	153	1
Montserrat	12	1

Note: Table does not include North Atlantic countries

a) See notation d) Table 1

b) Source: World Bank. 1978 World Bank Atlas, Population, Per Capita Product, and Growth Rates. Population statistics from mid-1976.

c) Source: Sidney E. Chernick. The Commonwealth Caribbean (Baltimore: The Johns Hopkins University Press, 1978), p.3.

- published summaries of data and state-of-the-art papers, e.g., FAO's Progress in Land Reform publications, the Land Tenure Center Reports, and the SOAP produced by RTI (the SU 507 Report Series) and the Smithsonian Institute's ICP occasional papers;
- annotated bibliographies of major "information banks" such as, the University of North Carolina's Pop Scan Bibliographies of its Carolina Population Center's Technical Information Service,
- major institutional publications such as the UN's general and specialized agencies' publications, the Population Council publications, the HEW's International Health Unit's Syncrisis reports; and USAID's publications;
- published journal articles, monographs and books; and
- some unpublished reports and theses produced by various universities within the U.S.

All SOAPs search the literature on the basis of certain posited hypotheses culled from theoretical constructs which have been either developed by other scholars or synthesized by the SOAP writers. Underlying the major theoretical constructs were the following key assumptions:

- fertility of the rural population is influenced by (and dependent on) the social, economic, political, cultural and religious context within which these populations reside;
  - differing social, cultural, political, economic and religious systems place differing "values" on offsprings;
- publicly funded rural development activities "transform" the economic and social environment, thus affecting the "context" within which fertility changes occur;
  - the effects of rural development program/policy interventions on fertility is indirect
  - fertility decisions and preferences are socially and culturally defined rather than biologically
- the "desire for offspring vary among cultures, sub-populations within a region and even a country, and is basically subject to "rational" decision making (based on economic and cultural constraints); the relative economic and social weights assigned to various levels of "desired family size" can be studied;
  - the relative weights can be influenced by deliberate programmatic interventions which in effect alter the social-economic-political-cultural context; therefore,

- although "time lags" are built into the decision making - intervention chains, such lags are usually not dealt with adequately;
- observed correlative relationships between intervening variables and fertility on the one hand, and rural development program interventions, on the other hand, are first approximations of possible causal relationships;
- the strength of the causal chain of change relationships cannot be fully determined at this juncture because many links, and their subsequent strengths, must be treated as conjectures at best.

In the final analysis, all theoretical constructs attempt to model an individual couple's motivation to have small, moderate or large families. Such motivation rests with the individual perception of his present status, the socio-psychic and economic impact of moving from one parity position to the next, and the desired changes in status at time  $t + 1$ . Access to family planning services becomes important to individual's freedom/capacity to attain their desired family size objectives.

A final word of caution is needed here: fertility impact and population change is not necessarily synonymous to fertility or population size reductions. All SOAPs tended to assume a decline as an a priori objective of this whole exercise. It must be emphasized here, though, that both positive and/or negative rural development programs' impacts on fertility/population size changes are relevant to AID's section 104d of 1977 amended U.S. Foreign Assistance Bill.

RURAL DEVELOPMENT, WOMEN'S ROLES, AND FERTILITY IN  
DEVELOPING SOCIETIES: A REVIEW OF THE LITERATURE

By

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OBJECTIVES

The report reviews the state of knowledge on the impacts of rural development on fertility in the developing regions of Africa, Asia, Latin America, and the Middle East and North Africa, especially as specifically types of externally introduced rural development activities produce changes in women's familial, economic, and other roles. Two central questions are addressed:

1. How are the roles of rural women likely to change as a result of rural development?
2. What are the consequences of such changes on fertility-related behavior?

The immediate objective of the review of the literature is to generate an inventory of hypotheses relating rural development, women's roles, and fertility which, at a later time, would be tested using data from selected completed or on-going rural development projects in several LDCs.

THE CONCEPTUAL FRAMEWORK

The effects of rural development on women's status and roles are problematic and are influenced by several key intervening variables, including the following:

1. Economic variables, particularly regional, country and subcultural variations in the extent, nature, and visibility of traditional female economic activities and in conditions of agricultural labor supply and demand. To illustrate: (1) regional differences in female economic participation range from the low, largely invisible subsistence activities

of women in the Middle East and North Africa to the substantial, highly visible, and largely unrestricted income-generating activities of African and Southeast Asian women on or off the farm; (2) among Asian women, the participation continuum range from the very low in Bangladesh to the very high rates in Thailand, and (3) in India, agricultural employment is high in the south but negligible in the north.

2. Demographic variables, particularly variations in age at marriage, type of marriage and family structure, and marital disruption.
3. Cultural variables, such as values and attitudes related to motherhood, women's seclusion and mobility, son preference and male dominance.
4. Social psychological variables, such as sex role attitudes, work commitment, fate control, perceived costs and benefits of children.
5. Political and conjugal power, particularly variations in women's rights related to mate selection, marital decisionmaking, and postmarital security.
6. Stratification variables, particularly those related to land ownership. Sex roles segregation and definitions of appropriateness of agricultural work for women differ by social class, with women from landless poor families more likely to equally share in most agricultural work and decisionmaking.
7. Family planning variables, such as marked regional and country variations in organized family planning efforts and goals. To illustrate: explicit government policies promoting and supporting family planning programs which are decidedly anti-natalist in orientation are unique to the Asia region. At the other extreme is Africa where half of the countries have pro-natalist policies. It may be noted, however, that generally, family planning programs have not effectively reduced

fertility in the rural areas of the less-developed countries.

#### RURAL DEVELOPMENT AND WOMEN'S ROLES

A general proposition that has considerable support in the literature is that agricultural development has negative effects on women's roles under certain conditions, specifically (1) where women's participation in the subsistence economy is traditionally high, as in most of Southeast Asia and sub-Saharan Africa, and/or (2) where there is an excess of landless hired female agricultural labor, such as in parts of Indonesia and India. The literature suggests that the adverse impact of rural development is due, at least in part, to the indiscriminate application of the Western model of gender-based division of labor in rural development projects, even in areas where women are active participants and decisionmakers in food production, processing, and marketing. The model has excluded women in the planning and design of development programs, has ignored their economic roles and needs in skills training and technology transfer, and has directed women to family planning, training in childcare, nutrition and homemaking. Extension services are generally aimed at men, even in subsistence activities which traditionally fall under the women's domain, e.g., seed storage, care of poultry and animals, tending a vegetable garden, etc. Thus, women are simultaneously being deprived of their significant traditional economic roles and being precluded from participation in non-traditional economic activities, as the economy shifts from subsistence farming to cashcropping and modernization. Largely due to the displacement of female rural workers by men and machine, downward trends in economic participation have been noted in Egypt, India, Pakistan, Peru, and Guatemala. Moreover, declines in rates of labor force participation by females in the prime of their child-bearing years are projected in all the major regions of Asia and parts of the Middle East and Africa.

The impacts of rural development strategies on women's roles are related to ownership of or access to land. The benefits of farm modernization, for

example, accrue to the female members of land-owning families, particularly in areas where hired agricultural labor is in short supply. Farm mechanization reduces the tediousness and the amount of time spent by women in paid or unpaid agricultural work.

Cultural values and practice of female seclusion, which are very marked in the Middle East and in most of South Asia, make women particularly vulnerable to exclusion from participation as agents or beneficiaries of rural development projects. Cultural prohibition of contact with non-kin male precludes women's access to marketing channels for the products of their subsistence activities, to credit, and to non-agricultural employment opportunities. Rural development projects geared toward providing women with income-generating skills and activities would have problematic impact on women's extra-familial roles unless these cultural factors are taken into account. An approach suggested in the literature is to establish small-scale, women-only, collectively organized light industry which also provides residential quarters for young single women.

#### WOMEN'S ROLES AND FERTILITY

Several hypotheses relating women's fertility to various types of economic participation, namely, in subsistence agriculture and home-based industry, cash cropping, off-farm industry, and trading and commerce, are examined.

#### Participation in Subsistence Agriculture/Home-Based Industry and Fertility

The available evidence generally suggests that female participation in subsistence agriculture or home-based employment is either positively related to or has no significant impact on marital fertility. The reasons frequently cited in the literature for the apparent compatibility between this type of work and marital fertility include the following:

1. A woman may keep her children with her while being engaged in extra-familial income-generating activity. She does not have to choose, therefore, between the economic and the motherhood roles.

2. The value of children as productive helpers is high, while the cost of childbearing is low. Thus, women are motivated to have as many children as possible and are not likely to practice birth control.

There are indications, however, that the direction of the cause-and-effect relationship between subsistence-farming/cottage-industry work and childbearing is in the opposite direction than that generally assumed in the literature. That is, it is the need to help support a large family that forces rural women to seek employment in agriculture/home-based industry rather than either of the latter encouraging high fertility.

#### Participation in Cash Cropping and Fertility

Most of the women's participation in cash cropping is either as helpmates to their husband/fathers or as hired casual agricultural workers. There is no evidence indicating that the fertility of women in cash cropping is different from that of women in subsistence agriculture or home-based industry. The increasing displacement of women due to agricultural modernization in the absence of alternative employment opportunities may be expected to have negative consequence for their status and roles in the family and in society. This, in turn, may be expected to have pronatalist consequence since their reproductive role may become the only significant role open to them.

#### Participation in Off-Farm Industry

In general, the data suggest a positive or lack of relationship between off-farm employment and marital fertility in the rural areas, due to the following factors:

1. Availability of cheap domestic help.
2. Extended-family residential patterns which ensure the presence of surrogate mothers.
3. More flexible hours of employment which provide considerable compatibility between child care and work patterns.

Moreover, employment alone, even in the urban areas, does not by itself lower fertility. The central factor in the employment/fertility equation is the

degree to which the separation of domestic and work-related activities are made attractive by real economic gain. The negative relationship is that between fertility and well-paid work outside of traditional economic roles.

#### Participation in Trading/Commerce and Fertility

The empirical evidence suggests a compatibility between fertility and participation in trading and commerce. Macro data show that in parts of sub-Saharan Africa and Southeast Asia, where women play an important and highly visible role in trade and commerce, fertility rates are not significantly lower than in other developing regions. Micro data in Latin America show no incompatibility between market activities and childbearing. The hypothesis remains largely untested in the Middle East and South Asia since women's participation in trade and commerce in these areas is negligible.

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RURAL DEVELOPMENT, EDUCATION AND FERTILITY:  
A STATE-OF-THE-ARTS PAPER

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The primary aim of the Rural Development, Education and Fertility paper is to provide a comprehensive review of the present state of knowledge concerning selected rural development interventions and their impact on education and hence fertility in the developing regions of Africa, Asia, Latin America and the Middle East. The rural development interventions considered were participation of the rural poor, extension of social services, rural marketing systems, area development, rural finance systems and off-farm employment.

The paper includes a conceptual explanation of the rural development interventions, both a general and region-specific hypothesis inventory on the relationships between the rural development interventions, education and fertility, and an annotated bibliography.

The authors utilized a theoretical model of human fertility developed by Richard Easterlin to integrate the hypotheses identified into a logical framework for analysis and review.

The Easterlin model basically focuses upon three sets of variables which affect fertility: demand for children, supply of children, and motivation for fertility regulation. Demand for children refers to the number of surviving children that parents would have if it involved no cost for fertility regulation. Demand for children is seen as depending on (1) income, (2) prices, and (3) tastes and preferences. Supply of children has to do with the number of surviving children that parents would have if they did not deliberately limit fertility. The supply of children depends on human fecundity, which is influenced by cultural and health factors as well as the survival prospects of children. According to Easterlin,

it is the relationship between demand for and supply of children which determines the motivation and cost for fertility regulation.

The paper reports on a considerable body of literature linking formal education and fertility, while noting the absence of existing literature on the relationship between non-formal education and fertility. Furthermore, almost no studies were identified which specifically focused upon the consequences of the rural development interventions for education and hence fertility.

A number of tentative and speculative hypotheses concerning the linkage between rural development activities, education and fertility were advanced by the authors, but only the education-fertility hypotheses are presented with supporting theoretical and empirical evidence.

The analysis of the education-fertility linkage suggested the following:

(a) With respect to supply factors:

- (1) Education will vary inversely with probability of a woman's ever marrying.
- (2) The greater the level of education, the greater the delay of marriage of women. This will shorten the fertile period of a woman's life.
- (3) The greater the level of education, the better the health of couples. This will result in increased fertility.
- (4) The greater the level of education, the more likely will it be that cultural predispositions toward longer lactation periods and postpartum abstinence will be altered and shortened.
- (5) The greater the level of education of parents, the lower the level of infant or child mortality.

(b) With respect to the demand for children:

- (1) The greater the level of education the smaller the ideal family size and the smaller the desired family size.
- (2) The greater the level of education the lower the desire for a large number of sons.

- (3) The greater the level of education the lower the perceived benefits of children and the higher the perceived costs of children.
  - (4) The higher the level of education the greater the perceived ability to afford children.
- (c) With respect to fertility regulation factors:
- (1) The greater the level of education the greater the knowledge of birth control.
  - (2) The greater the level of education the more positive the attitude of couples toward birth control.
  - (3) The higher the level of education the more likely the use of contraceptive devices.
  - (4) The higher the level of education the more likely will there be husband-wife communication concerning family planning practice.

The hypotheses were generally supported by empirical studies in each of the developing regions, however, for some of the hypotheses much more significance was accorded them in urban areas than rural areas.

Although no substantive conclusions were drawn from the empirical literature with regard to the impact of the rural development interventions on fertility via education, there appears to be a theoretical basis for the view that over the long run rural development interventions promote higher levels of education among rural populations which, in turn, depresses fertility rates. This, of course, depends upon the transformation of group norms, familial institutions and personal attitudes.

Finally, the paper recommends the following for future research considerations:

- (a) an examination of specific rural development projects and their fertility-related consequences. The rural development conceptual categories currently employed by USAID are too vague and unwieldy to be of any value in measuring the population impact of USAID rural development interventions.

- (b) an examination of the effects of non-formal education on fertility behavior. This is warranted if intelligent and informed conclusions are to be made regarding the impact of rural development projects on fertility.
- (c) an examination of the fertility-related consequences of rural development interventions by means of retrospective and prospective case studies which employ extended time frames. Both types of studies are required in order to assess the nature and extent of measurable changes in the rural development - education - fertility relationships.

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RURAL DEVELOPMENT, MIGRATION AND FERTILITY:  
WHAT DO WE KNOW?

By

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In the last few years, a number of reviews of migration and development have been published.<sup>1</sup> While smaller in number and scope, there have also been a few reviews of the extent to which we understand the relations between migration and fertility.<sup>2</sup> Then, why is it necessary to produce yet another document reviewing the "state-of-the-art" for development, migration, and fertility? First, the focus for this document is the interaction of rural development efforts, migration out of rural areas, and fertility, especially rural fertility. To our knowledge, there are no comprehensive reviews that explicitly incorporate all these variables. Second, the existing reviews do not adequately reflect the very diverse nature of the migration process, in which migrants, migrant destinations, and migrant origins each vary considerably. Certainly, one lesson development practitioners have learned is the importance of designing programs for specific target groups and specific situations.<sup>3</sup> Therefore, we have attempted to provide a level of discussion which is more specific with respect to the nature of the rural outmigration or development context, specific variables inducing migration, the types of persons responding to the migration variables, and the nature and limitations of subsequent rural fertility changes.

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<sup>1</sup>See Brigg, 1973; Findley, 1977; Simmons et al., 1977; Todaro, 1976.

<sup>2</sup>See Zarate and Zarate, 1975; Findley, 1977: Chapter 5; Bouvier and Rosenberg, 1975.

<sup>3</sup>See Chambers, 1974; Owens and Weiss, 1975.

## Migration and Fertility: A Summary of the Findings

Migration and fertility are both demographic phenomena that are assumed to involve decisionmaking by individuals or households. In the review of migration theories and findings, we show that migration can be viewed as a conscious attempt by individuals or households to increase their income by moving to an area when they perceive employment opportunities to be superior to those available in their present community. Of course, the degree to which migrants actually weigh alternatives and "optimize" their choice of destination varies. There is ample evidence that migration decisions are somewhat constrained by limited information, resources and time to invest in moving per se and by family-related concerns.

Fertility decisions are also assumed to reflect a conscious consideration of the economic gains or losses associated with childbearing. Yet these decisions--and their degree of conscious analysis--are also constrained by limited information, ability of the household to take risks with respect to childbearing, and by expectations of the family or partner. Easterlin has developed a generalized model for these factors.<sup>4</sup> According to his model, a woman or household varies childbearing in order to optimize its utility. The childbearing decisions are affected by the household's income, price of children, and costs of regulation.

Theoretically, these variables determine desired family size. Bongaarts argues that actual fertility behavior is almost completely determined by the four proximate variables of contraception, lactation, induced abortion, and age and duration of marriage.<sup>5</sup> It is through these proximate variables that the income and cost of regulation variables affect fertility behavior.

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<sup>4</sup>See Easterlin, 1969.

<sup>5</sup>See Bongaarts, 1978.

To correctly identify the effects of migration on fertility, we must examine the net effects via these proximate variables and, indirectly, the Easterlin model variables. Based on our review of the evidence regarding the effect of migration on these variables, we conclude that migration affects fertility levels among migrants and perhaps among nonmigrants in the rural origin. The fertility effects are, however, very complex and not automatic.

Migrant women will desire or have smaller families after moving if they:

1. Are young at time of migration;
2. Delay marriage or first union;
3. Experience lower infant and child mortality in conjunction with continued lactation and abstinence or use of birth control methods;
4. Have or obtain literacy skills;
5. Have aspirations for self or children;
6. Interact with reference groups supportive of small families;
7. Are committed to work outside of the home and a non-housewife career;
8. Are less reliant on children for help and plan more investment in children's education and support;
9. Exhibit cultural openness to modernization and change; and
10. Are aware of and can obtain contraceptives.

The findings do not permit generalization regarding an additive or interactive nature of influence.

Of all the factors that are likely to result in migrant fertility declines, education for the migrant woman is probably the most critical. Through education and residence in the city a migrant woman is more likely to develop a desire to limit births and to evolve into a situation where such limitation is feasible, supported, and economically advantageous. But the relation between migrant education and fertility reduction is complex; many circumstances, such as cultural norms, can alter the expected size or direction of influence.

For which woman is migration less likely to produce a lowering in fertility goals or attainment? Basically, the women who may not reduce fertility are women whose situations are opposite to those stated in the ten propositions above.

1. If a migrant is old (over age 30), she has probably had children, and moving to a city is not likely to reduce her family size.
2. If a migrant woman marries shortly after arrival, she is less likely to have fewer children. This results both from an increased exposure to risk of pregnancy and a lower probability of setting in motion the education-aspiration link.
3. If a migrant woman continues to experience high infant mortality, she will continue to have closely-spaced births and replace deaths.
4. & 5. If a migrant woman has little education, she is less likely to develop aspirations or a commitment to work outside the home. She is also more likely to be locked into traditional child-dependency situations.
6. If a migrant is relatively isolated from groups who might stimulate and support a desire for small families, she is also not likely to have a small family. Thus, women who live in neighborhoods with little observable family size variation or who work primarily with those like themselves are not likely to experience a fertility decline.
7. If a migrant is unable to obtain employment outside the home or has a "traditional" attitude towards women's roles, she is not likely to deviate from the expected pattern of childbearing.
8. Perhaps most important, unless the economic realities for women differ substantially, the migrant in the city may be just as dependent on a large number of children as her rural sister. Families with low incomes generally cannot afford to send children to school; instead, children are needed to help out at home and with the families' income-producing activities. In addition, families living at the margins of subsistence are expected to prefer the certainty of children with their known costs and benefits to the risks of smaller families.
9. Even if a woman wishes to limit or space births, she may not do so if she has no close friends who use contraceptive methods. If a woman is not interacting with persons unlike herself in terms of family planning experiences, she is not likely to have friends who will recommend using birth control methods.

The migration findings suggest three additional, related conditions under which migrant women would not be expected to alter their fertility goals or experience.

First, many migrants do not go to cities, and the differences between the origin and destination communities may be more limited, particularly with respect to the variables outlined above. Because we model the migration-fertility relation as a change in fertility behavior in response to contextual or personal changes from the old patterns, there is little stimulus for fertility change.

Second, much migration is not once-in-a-lifetime. Migrants may move back and forth between the home village and one or more destinations, depending on changes in opportunities in the various places. In this instance, a migrant may be in and out of the rural context many times. Because of the changing destinations or durations of migration, the migrant may not develop strong commitments to urban living. For him or her, the home rural community may continue to be the central reference point for decisions. Thus, fertility expectations would continue to be shaped by rural norms. Again, duration and the repetitive dimensions of migration are much needed variables in subsequent migration-fertility studies.

Third, migration often is the vehicle by which rural households spread their resources between different areas. If families pursue the "dual household, extension strategy," they maintain a rural base, the stem household from which others branch out. For these households, migration is the means by which the household, adapts its large household size to the changing economic constraints of rural and urban areas. Any nascent economic pressures to limit births are diffused by geographical relocation of "excess" members. In addition, the strategy works best if there are several children: some to continue subsistence farm work, some to assist with household chores and child care, and some to seek out wage labor in other rural or urban areas. Thus, the migration strategy

of household extension may perpetuate or even intensify pronatalist forces operating through perceptions of child utility. This is a top priority item for migration-fertility research.

### Migration and Rural Fertility

Most migration-fertility literature has focused on the effect of migration for migrant fertility. Very little research addresses the related issue: Does out-migration influence the fertility behavior of women left behind in the rural origin? The following are potential mechanisms through which migration may lead to a rural fertility decline.

1. Change in the sex ratio resulting in a higher probability of women remaining single. Alternatively, where women are the migrants, limitations on male marriage. The research shows no consistent relations between changing sex ratios and fertility of women remaining behind.
2. Reduced exposure to the risk of pregnancy due to lengthy separations. Again, the findings suggest no certain relation between separations and ultimate family size.
3. Returnees who introduce new "small family" ideas and examples, especially over a long period of time. Limited evidence supports this proposition for more selective migrant returnees.
4. Remittances which operate via the "price effect." If remittances are used to defray child-related expenses, such as schooling, migration does not stimulate activity declines.

The following are potential mechanisms for which there is no evidence:

5. Increased information about urban lifestyles, consumption goods, and opportunities, operating to change "preferences" for children vs. other goods.
6. "Demonstration effect" of successful educated migrants which would operate via a change in perceptions about the number of children and the level of education necessary for "success." Essentially, the demonstration effect operates through the "price" effect.
7. Continued maintenance of large family norms via the migration household extension strategy.

## Fertility Outcomes of Rural Development Programs; Indirect Effects via Migration

The final section of the paper briefly reviews the potential rural fertility outcomes of selected rural development programs that affect migration. Programs considered include:

1. Increased participation of the rural poor in development activities;
2. Expansion of off-farm employment opportunities;
3. Development of rural financial markets;
4. Extension of social services to the rural poor;
5. Development of rural marketing systems; and
6. Area development.

Given the assumed program outcomes, most of the programs will have an impact on rural migration, but very few of the programs will slow or stop rural-urban migration. Rather, a major effect of the programs which improve the income and opportunities for the rural poor will be less rural-rural migration, and then only if the long-term economic outlook for rural areas has changed significantly. Most of the programs accelerate rural-urban migration of the moderately selective, if not immediately, in the long term. Depending on their scope, the off-farm employment programs probably offer the most potential for a change to the rural-urban migration patterns of the moderately selective migrants. In particular, such programs can facilitate more short-distance rural-urban moves or rural staying with urban commutation. Without substantial changes in the prospects for agricultural income growth via improved rural-urban terms of trade, it is unlikely that solely rural-based strategies will generate a long-term rural staying response among the moderately selective.

Migrants respond to conditions of economic opportunity and if the long-term urban opportunity expectations for either a formal sector or family-based informal sector strategy continue to be superior to rural opportunities, migrants will continue to be superior to rural opportunities, migrants will continue to move to cities. If among cities, these economic opportunities are fairly homogeneous,

destination choice may increasingly depend on non-economic kin, proximity, or quality of life factors, but the choice will still be in favor of cities. Those differences depend not on rural development but on urban development patterns.

Just as the immediate migration consequences of the rural development priorities are limited to shifts in the magnitude or destinations for less selective rural-rural migrants, migration's indirect effect on rural fertility is fairly limited. But in the long term, the indirect effects may be substantial, depending on the fertility consequences of migration remittances, returnees, visits, positive feedback, demonstration effects and so on. These effects will depend on the migrants' experiences in cities. In particular, if migrants adopt small family norms, then they may introduce these concepts to rural areas when they return or through their visits. As noted above, there are many factors which can inhibit migrants' adoption of small family norms. Thus, even if the indirect, long-term rural fertility effects exist, we cannot expect them to be associated with all migrants.

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RURAL DEVELOPMENT ACTIVITIES, FERTILITY,  
AND THE COST AND VALUE OF CHILDREN

By

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Introduction

As experience with rural development programs and family planning programs has accumulated it has become increasingly apparent that the fertility of rural populations is not independent of the social, economic, and political context within which these populations reside. To the extent that publicly funded rural development activities transform the economic and social environment, they also may alter the context within which fertility changes occur. It becomes desirable, therefore, to understand how these activities either promote or retard the reduction of rural fertility.

This paper is an attempt to use existing social science research on fertility in low income countries to assess the connections between economic development programs, the cost and value of children, and fertility. It develops a model of reproductive behavior that will serve as a framework for the analysis of the ways in which rural development programs can, intentionally or unintentionally, affect fertility levels and trends by altering the cost and/or value of children to their families. In addition, it pinpoints those areas where our current understanding of the linkages between development programs, the cost/value of children, and fertility is weakest.

The theoretical framework adopted for this paper draws heavily upon the recently developed microeconomic theories of fertility. Over the past two decades there has been a growing consensus among social scientists that reproduction can be viewed as an allocative process. Families are faced with limited stocks of time and money that must be allocated to child rearing, the

family's social and economic advancement, the demands of the extended family, and to the government in the form of taxes. To the extent allowed by law and the socioeconomic environment, this theory characterizes couples as attempting to choose the mix of family size and other activities that maximizes their own or their children's perceived welfare. This theory of fertility differs from the standard theory of the consumer in that it explicitly recognizes the impact that the socioeconomic environment has on allocative decisions. Moreover, it is flexible enough to include allocative behavior in settings that would appear to preclude purposeful, rational, or consistent activity. It specifically recognizes that the normative economic and social pressure to have children may be so strong, the cost of rearing them so low, and the impediments to effective fertility regulation so severe that fertility may appear to be essentially unplanned and irrational. This so-called irrational fertility behavior can, therefore, be considered to be a special case of the general decision-theoretic model of reproductive behavior in which parents balance the benefits and the costs of child rearing in determining their own family size.

This paper focuses on the nature and determinants of the benefits ("value"), both economic and psychosocial, and the costs, both temporal and financial, that are associated with children and child rearing in the rural areas of developing countries. It recognizes that allocative reproductive behavior takes place in a socioeconomic context that may be radically altered during the course of rural development, and it demonstrates the manner in which rural development programs can alter rural fertility by changing the social and economic context within which individual reproductive decisions are made.

### The Value of Children

Section II of this paper discusses the many psychosocial and economic benefits that children bring to their families in rural areas. A large and growing literature on the value of children in peasant societies is discussed

and comparisons are made between major geographic regions: Asia, Africa, Latin America, and the Middle East. Among findings that emerge is the almost universal tendency of the economic value of children to decline as economic development proceeds.

In urban areas throughout the Third World, the economic contribution of children has ceased to be a major motivating factor for large families. Only in rural areas (and in particular, in the poorest rural areas) does the economic contribution of children remain a significant motivating factor for large families. However, whether or not children are perceived as net economic benefits or costs in rural areas remains a subject of considerable debate. Many studies throughout Asia have indicated that children in low income rural areas are perceived to be of significant economic value. Findings from West Africa also indicate that children are perceived to be of considerable economic value in agricultural areas. However, other findings suggest that children remain in sizable net financial drain on their parents, and the debate continues over whether or not children represent financial assets in rural communities.

In a sense, this debate is academic for policy purposes. What is important is to understand how the economic value of children is altered by rural development policy. To the extent that these alterations are understood and their effect on fertility can be plotted, the connection between rural development programs and reproductive behavior will be understood. At this point in time, the literature has little to say about the effect of development policy on the economic value of children, and this remains an obvious subject of future research.

The other dimension of the value of children is their psychosocial value. Section II of the paper describes in detail studies exploring the different psychosocial needs that children fulfill in various societies. In particular, the connections between the social and political structure of a region and the value of children are assessed. Again, major differences appear by geographic region.

These are discussed in detail in the paper. A major general finding of the review is that the psychosocial value of children is a relative value, relative in the sense that benefits from parenthood are weighed in relation to the benefits available from alternative activities in rural areas. For example, in some rural settings there may be virtually no alternatives available for a woman besides the role of wife and mother; however, in other settings the alternatives to motherhood may be sufficiently attractive to make the relative value of children smaller. Development policy can be carried out in such a way so as to maximize the alternatives to parenthood that present themselves in the course of the economic transformation of rural areas.

#### The Financial Cost of Children

Demographic research has, over the past two decades, consistently reported that parents perceive the high financial cost of rearing a child to be the major factor motivating them to have smaller families. This result has been reported in settings as diverse as the urban United States and rural Philippines. Moreover, many parents who report that the cost of children is a major limiting factor on their desire for additional children specify that it is the cost of educating their children that is perceived to be the most burdensome component of that cost. Unfortunately there are hardly any studies available that can inform policy makers as to the actual component-by-component cost of children, either in urban or rural areas. Although the view that children cost more in urban areas is current and plausible, there is as yet virtually no documentary evidence that this is true.

The financial cost of a child is determined by the normative standards that parents bring to child rearing, and by the availability and price of the market commodities employed. However the literature is deficient also in its treatment of the determination of child rearing standards, and since it is these standards that determine the possibilities for the substitution of commodities in child rearing as relative prices change, it is not possible on the basis of current

knowledge to describe how rural development programs can alter the price of a child. Therefore, although there is strong theoretical evidence that the cost of a child is an important determinant of fertility, the link between rural development and the financial cost of a child remains largely unexplored. The paper presents what evidence there is available from the Third World, and suggests ways in which research might be utilized to strengthen our understanding of the relationship.

#### Time Cost and Fertility

The situation is slightly better with respect to time costs of children. We know in a very general way that various measures of the time cost of a child are strongly related to fertility. In numerous settings in the Third World, high time costs are associated with lower fertility, particularly when the high costs are associated with the mother. Another finding that is both plausible and widely reported is that the time cost of a child is less important in areas where nonchild rearing activities can routinely be carried out jointly with child care. This suggests that the social and economic organization of rural society is much more conducive to the joint roles of producer and mother.

However, a number of issues remain unresolved. In particular, the measurement of the opportunity cost of parental time continues to present problems. The variables used to measure opportunity cost are deficient on a number of theoretical and empirical grounds and as a result it is not possible to trace with any precision how rural development activities might actually affect the value of a woman's time in varying pursuits. Very little empirical evidence exists detailing the linkages between development policy and the cost of children; however, a number of suggestions for the interpretation of available evidence are advanced.

#### Conclusions

The paper concludes with a number of suggestions for policy interventions that can be inferred from the literature on fertility and the cost and value of

children. Given the state of the literature in this field, many of these suggestions can be only tentative in nature. Perhaps more importantly, the paper suggests research that can be undertaken relatively cheaply that would markedly increase our understanding of the rural development policy, cost and value of children, and fertility nexus.

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RURAL DEVELOPMENT, LAND AND HUMAN FERTILITY  
A STATE-OF-THE-ARTS PAPER

By

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Rural development policies in less developed countries are often designed to change the availability, access, and quality of land for rural populations. The impacts of such policies on demographic behavior, particularly fertility behavior, have been largely ignored. This paper initially reviews the existing theoretical and empirical literature on the relationship between land and fertility; then it examines selected rural development policies designed to directly influence the availability and institutional access to land. Finally, mechanisms which indirectly affect land tenure arrangements are reviewed.

The central importance of land to agrarian societies has not been recognized in most demographic development policies or programs. The relative availability of land and labor greatly influences agricultural production patterns and techniques and, at the same time, largely determines the distribution of income, wealth, and power resulting from the use of land. The distribution of land is thus a major determinant of the class structure in rural areas.

We have found it useful to think of land availability as having three major dimensions. First is simply the physical availability of land, which is perhaps the usual concept. Second is the quality or use-capacity of the land which includes variation in the productive capacity of the land. Third is legal and informal institutional forces which govern the use of property and the distribution of the produce of the land. In short, in viewing the availability of land it is important to consider not only the physical availability but also the quality of the land and the conditions governing access to land.

The dimension of land that has received the greatest attention is its physical

availability. The relationship between land availability and human fertility has been examined at the aggregate level where the major concern has been to explain the fertility impact of settlement patterns and programs designed to increase the number of farm sites available. The relationship between farm size and human fertility has also been examined where family size is postulated to be a function of the area cultivated by the individual family.

The literature on the physical availability of land is basically Malthusian in concept. That is, the availability of land at the aggregate level is associated with higher levels of areal fertility, and at the individual level, farm size is positively associated with family size. At one level, it might be argued that within an agrarian system social and economic forces exert pressure toward a uniform land-man ratio. It can also be argued from the household perspective that larger farm sizes increase the economic value of children and negate the need for off-farm employment by women in the household. Further, the implications of the cost-benefit analysis regarding family size are reinforced by a positive income effect on the demand for children and a smaller quality or price effect across various farm sizes.

The literature reviewed supports the thesis that the physical availability of agricultural land at the aggregate and individual family level is positively related to human fertility. The aggregate relationship was found for areas as diverse as the historical U.S. and Canada, Latin America, India, Thailand, the Philippines, Iran, Poland and many countries of Western Europe during the eighteenth and nineteenth century. The positive relationship between farm size and fertility likewise appears to hold over the diverse conditions of the developing world. It is only under conditions of dynamic technological change, coupled with increasing farm size, that the relationship appears to break down.

Theoretically, increases in land quality appear to be similar to increases in the quantity of land available under conditions of constant technology.

That is, land of a higher quality would seem to increase the absorptive capacity for labor and capital inputs and produce greater levels of income. Similarly, if the value of agricultural land is closely tied to the flow of income the land can generate, it would seem that doubling the quality of a given piece of land would be comparable to increasing the land size by a factor of two. However, the conceptual relationship between the quantity of land and the quality of land available breaks down with changes in technology. Thus, technology is not neutral in its impact on the demand for the various factors of production. Technology may increase the relative demand for land, capital and/or labor. As a result, improvements in land quality brought about by changes in technology may influence factor proportions differentially. Evidence on the relationship between quality of land and fertility is virtually non-existent. The one study we found which attempted to directly measure land quality or land-use capacity in terms of productivity reported quality to have a positive effect in one instance and no effect in another. The available evidence affords no basis for generalization about land quality and fertility.

Theoretical and empirical work on the relation of institutional access to land and fertility is more diverse and less systematic than that on land availability, yet more suggestive than that on land quality. Access to land is practically and theoretically essential to an understanding of the connections between the economic and social organization of rural societies and their fertility patterns. One of the problems plaguing research in this area is confusion between the institutional mechanisms which alter the availability of land to individual families, and the aggregate level results of the operation of those mechanisms, i.e., the distribution of landholdings.

Inheritance systems, land tenure patterns, and the distribution of land in rural areas each appear to have important potential impacts on the relationship between land and human fertility. Inheritance systems have an effect on nupti-

ality and fertility which are extremely complex and tied to other aspects of social organization, such as the land tenure system and economic opportunity in the nonfarm sector. Thus while characteristics of inheritance systems may well influence marital and reproductive behavior, it was not possible to delineate uniform effects of such systems. Instead, a more appropriate strategy would be to examine such systems within a given society, at a minimum, within a given level of technology and/or stage of development.

Historical work in Western Europe, as well as contemporary studies in the Philippines and Mexico, found land tenure to exert both positive and negative effects on fertility. It seems likely that the basis for the diversity of findings is that land ownership per se is associated with lower fertility, but that the relationship can be overcome by pronatalist inheritance systems or conditions governing land ownership which encourage large families. Thus, in the Philippines, land ownership appears to be negatively related to fertility, through its influence on factors such as age of marriage and female education. However, in Mexico, the ejido system of land ownership apparently encourages early marriage and childbearing. The paucity of work on this topic limits generalization. Nonetheless, the existing work is sufficiently suggestive, and the area is so central to development policy, that further research is clearly indicated.

Agrarian reform, settlement and colonization schemes are major types of programs designed to directly influence the availability and access to land of rural populations. Several tentative conclusions about their effects on the man-land relationship in developing countries may be advanced. In evaluation the results of agrarian reform for the specific dimensions of the relationship of interest here, it is necessary to keep in mind a fundamental contradiction. On the one hand, there is a consensus that neither agricultural development nor the

amelioration of rural poverty is possible in most countries without significant changes in the land tenure system. Yet, on the other hand, such change is clearly very difficult to accomplish, and there are relatively few real world examples of successful agrarian reform programs. Those that do exist offer support for the proposition that reformed land systems are more equitable and more productive, but the literature is not very helpful as a guide for achieving reform.

Agrarian reform and settlement and colonization schemes rarely make land more widely available. The nature of access to and limited amount of land raise questions about the relevance of the hypothesized relationships between land availability and fertility derived from historical studies of frontier situations. The man-land ratio in reformed areas is invariably high, although many reforms attempt to mediate this by establishing collective ownership. In theory, the quality of land distributed under a reform should be high; in practice, it appears that the best land remains unexpropriated. These generalizations suggest that the real significance of reform lies, first, in how it governs access to land, and, second, in the fact that it is generally unable to affect a large percentage of the rural population who increasingly join the ranks of the landless.

Several analyses of such programs conclude that in social and economic terms the record is discouraging, as serious implementation problems plagued all types of projects ranging from smallholder schemes to large state farms. The record in Latin America exemplifies the above. In Indonesia, the government-sponsored "transmigration" programs designed to settle the "outer islands" have had a negligible effect on rural poverty in Java. A conspicuous exception in Asia seems to be the Sri Lanka program where nearly 500,000 rural families were settled in lands short distances from the original residences. Although unit costs were high, a large proportion of the rural poor have benefitted.

The opening up of new territories, whether through directed or spontaneous colonization programs, is a development strategy distinct from agrarian reform. Settlement schemes have often been adopted to siphon off excess population in areas of high demographic density, and to divert pressure for land redistribution. Colonization in this sense is a politically expedient "solution" to over-crowding that avoids confrontation with entrenched rural elites who control large tracts of land.

The literature on settlement and colonization programs suggests several conclusions. The first, and perhaps most obvious, is that colonization is not a viable option for many countries. In many areas where density is very high, as in most of South Asia, Java, and Egypt, the arable land frontier has been used up. A second generalization is that colonization efforts rarely attain the goals they set out to accomplish. While any development program formulated and carried out within a political context invariably contains references to targets that are essentially rhetorical, colonization schemes frequently suffer from a more fundamental misconception. Faced with the contradiction between the pressure for agrarian reform on the one hand, and the resistance of landed elites on the other, the assumption emerges that new territories can be opened up for small farmers thereby creating an agrarian structure that is different from the already settled regions. This reasoning assumes that the process of colonization can be carried out in a way that is unaffected by the socioeconomic and political environment. This premise is untenable as colonists, particularly those engaged in spontaneous efforts, are subject to the same forces that are at work in the society of which they are a part. In many areas both small farmers and wealthy investors are attracted to newly opened lands that end up in the hands of large corporations who employ migrants as laborers rather than settlers, with few benefits accruing to the rural poor as a result. Finally, the expense involved is among the most limiting factors.

The literature on agrarian reform suggests that attempts to alter the redistribution and access to land in most developing countries through direct policy intervention have had relatively minimal impact. At the same time, it is evident that the agricultural sector in many areas is undergoing significant change as a result of a variety of indirect factors.

In principle, it is clear that forms of land tenure, as well as their geographical distribution and prevalence among different types of producers, are the final outcome of an exceedingly complex set of interactions. The original patterns of land distribution and land tenure, as well as the factors that contribute to changing these patterns, are conditioned by the socioeconomic and political context, historical events, factor prices, inflation, government policies, the international market, and include such variables as topography, soil quality, and the availability of water. The particular constellation of factors that have contributed to change in the agricultural sector, and the consequences of the trends that are taking place, vary in Latin America, Asia, and Africa. Even within national boundaries there are regional differences that demand attention. Under these circumstances broad, encompassing generalizations simply cannot do justice to the variety and complexity of the real world.

Among the most important factors that appear to affect the quality, quantity, and the access to land is technological change. Biological innovations such as the introduction of high yield varieties (HYV) and increasing use of mechanized production processes have a significant impact on the structure of the agricultural sector. The literature strongly suggests that the majority of benefits of mechanization and the adoption of HYV's accrue to large landholders. The introduction of high yield strains, and the efficiency provided by machinery results in greater productivity and profits, and substantially increases the value of land. As the net worth of land rises, and if renting is a common form of land tenure arrangement;

the landholder will probably be able to prevent the appropriation of the wind-fall profits by the tenant. One analysis of Pakistan, India, and the Philippines concluded that increased mechanization (tractorization) led to increased concentration of land ownership, a return to owner cultivation resulting in direct tenant eviction, and land renting by large farmers causing indirect eviction.

In summary, the present knowledge base regarding the connections between rural development policies, land and fertility provide only limited policy guidance for efforts designed to lower fertility. Nonetheless, the literature strongly suggests several points at which dimensions of land and development policy intersect with family size decisions, and which represent possibilities for policy intervention. Although the exact nature of these connections cannot be specified, an awareness of the potential impact of land-related changes on fertility behavior may at least reduce the chances of implementing policies that are pronatalist in effect.

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THE RELATIONSHIP OF FERTILITY TO INCOME  
AND WEALTH IN RURAL DEVELOPMENT

By

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Paradoxes abound in the relation of fertility to income and wealth. The sign of the relation (positive or negative) appears to depend largely on whether one is considering the long or the short run, the direct or indirect effect, the pure income effect or the substitution effect from economic development. Given the important effects of population growth on development, one should like to know whether and how the level and distribution of income are necessary, sufficient, or merely coincidental factors in changing fertility.

The empirical findings reported<sup>1</sup> are broadly consistent with a threshold relation of fertility to income in which fertility first increases, then decreases as the level of income and development rises (Easterlin, 1978). Even at the higher levels of development, however, the inverse relation is small relative to the total variation in fertility. Factors other than income are able to explain directly much of this variation in fertility.<sup>2</sup> Income growth by itself then does not seem to be necessary for significant fertility decline at higher levels of income nor sufficient at lower income levels. The observed relation of income and fertility also supports the proposition that an increase in income would lower the demand for children to the extent that parents have an incentive to substitute quality for quantity of children with their higher incomes. The

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<sup>1</sup>Tsui and Bogue (1978), Chenery and Syrquin (1975), Encarnacion (1975), Simon (1974:108).

<sup>2</sup>Mauldin and Berelson (1978), Tsui and Bogue (1978), Anker (1978).

high-quality route would make further substitutions more likely by increasing the cost of children.<sup>3</sup>

Most studies have found a positive relation of fertility to agricultural landholdings, suggesting that children and land are in some sense complements. Parents with land may be able to afford more children or children may be more useful to parents for working or acquiring land.<sup>4</sup> The few studies available (in Asia) indicate that by itself equality of land distribution is associated with higher fertility (Kleinman, 1973; Rosenzweig and Evenson, 1977). By contrast it has been argued that equality of income distribution is conducive to lower fertility (Repetto, 1978; 1976b; Kocher, 1973; Rich, 1973). This may be true at the higher income levels or for all countries combined, but for less developed countries the evidence that equality of income by itself lowers fertility is quite weak. Nonetheless, a good case can be that a more equal distribution (and higher level) of social services, which could accompany the change in income distribution, would lower fertility or hasten a fertility decline, even at the lower income levels.

The persistence of high fertility in low-income countries does not require the assumption of irrationality or shortsightedness of parents for its explanation. On the contrary, parents may be quite rational in preferring large families, given their social and economic milieu, including uncertainty and a low return on alternative investments.<sup>5</sup>

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<sup>3</sup>Becker and Lewis (1974), Becker and Tomes (1976), T. P. Schultz (1974b: 40-44). For a detailed survey, see Turchi and Bryant (1979).

<sup>4</sup>Summarized more extensively in Stokes et al. (1979).

<sup>5</sup>Schnaiberg and Reed, Caldwell (1977), Ware (1978), Nag et al. (1977), Bulatao and Arnold (1972), Arthur and McNicoll (1978b), Mamdani (1972), Cassen (1976), Simon (1974).

One way of describing the conditions that give rise to high fertility is a pervasive failure of markets in both the private and public sector to provide a menu of alternatives that would make low fertility attractive (Neher, 1971; Blandy, 1974). Such failures do not seem to be inevitable.

In the extension of social services, reforms would include not merely larger expenditures on family planning, health, and education but an optimal mix of such services. There is good evidence for favorable synergisms of public health and nutrition measures with the combination producing better health than the sum of the parts. There is also evidence that family planning is more readily accepted where health standards are higher. An integrated program of health nutrition and family planning then might provide more effective service at lower cost than the separate components.<sup>6</sup> How much fertility might be reduced as a result would seem to have a high priority on the research agenda.<sup>7</sup> It seems plausible that such a family health program synergisms would be strongest where life expectancy and health conditions were lowest.<sup>8</sup> If so, integrated programs might yield the highest benefits where population problems have been particularly intractable and have had the most deleterious consequences for development. Improved health might also result in measurable productivity gains (Ram and Schultz, 1979). Increased life expectancy and productivity would both give parents further incentive to substitute quality for quantity in their fertility decisions as income rose.

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<sup>6</sup>Johnston and Meyer (1977) and Cassen (1976)

<sup>7</sup>For evidence, see Taylor et al. (1975), Johns Hopkins University (1978), and T. P. Schultz (1976b).

<sup>8</sup>For example, infant mortality has a much smaller estimated effect in Latin America than Asia or Africa in the Tsui-Bogue equations (1978), corresponding to the difference in life expectancy.

Another quality-quantity tradeoff might be effected through educational expenditures if parents with low fertility could be provided with increased access to educational facilities for their children to match the lower costs that they imposed on the educational system.<sup>9</sup> Increased emphasis on nonformal education might also provide more immediate benefits to adults. A conjecture worth further study is the such nonformal education opportunities would lead them to substitute investment in themselves for the marginal child.

Rural development strategies offer a number of ways that growth and equity might be promoted. There is a considerable body of literature supporting the efficiency of less concentrated landholdings Johnston (1977). As Stokes et al. (1979) note, however, development is more likely to follow if the smaller farmers have adequate access to extension services, rural infrastructure, credit, and appropriate technology, all of which policy can significantly influence. Conversely, it has been argued that the distribution of landholdings may influence the direction of public policy (Raj, 1972; de Janvry, 1973; Griffin, 1974a, 1976).

The direct effects of rural development strategies on fertility are not well established. The limited evidence available suggests that by itself a more equal distribution of land would raise fertility. A plausible case can be made that agricultural modernization would lower fertility, more certainly in the long-run, by raising the return on alternative assets. By this view, nontraditional farm inputs and children would be substitutes, unlike land and children. The hypothesis is virtually untested for low-income countries. Nonetheless, it is consistent with the view that appropriate technologies (Carr, 1976) and pricing policies (Mellor, 1976) could accelerate agricultural and industrial development. The policymaker is presumably already concerned with rural modernization. Estimation of the strength of the modernization-fertility relation might be of interest

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<sup>9</sup>Salaff and Wong (1978); Wang and Chen (1973).

because of positive feedbacks from lower fertility to development, for example, through increased saving.

Financial institutions provide another vehicle for raising the return on non-child assets for "bond" holders. They can increase credit access and net return on investment for borrowers at loan rates lower than on unorganized markets. Lack of credit access seems to have been a major obstacle to adoption of new agricultural technologies and mechanization by smaller farmers (Lipton, 1978). The security of higher-yielding financial assets and the higher return on modern farm technologies provide plausible alternatives to investment in larger families. Lifting ceilings on interest rates and loan rates could help to accomplish both of these objectives. Casual empiricism supports these demographic implications, but they have not yet been subjected to a more direct test. Such reforms, however, could have substantial advantages for other reasons (McKinnon, 1973).

Participation of the rural poor beyond the areas already mentioned is likely to be effective to the extent that social mechanisms can be devised that are perceived to be in their direct interest. Even negative social controls may be accepted if they are seen as working toward the general interests of those in the community (Salaff and Wang, 1978; McNicoll, 1975). Effective social organization may be consistent with a wide range of institutional settings to reach the same end, but effective "intermediate level" organization seems especially important for internalizing the social benefits of community and regional action and the social costs of individual actions, for example, the costs of high fertility on social services (Arthur and McNicoll, 1978b). Success is more likely where organizations are able to concentrate on the ends of community action (mass literacy, etc.) rather than simple aggregates (number of schools, etc.). In connection with fertility, this would give a sharper focus to the real social tradeoff between quantity and quality.

As has been indicated, there remain a number of promising but inadequately tested areas for further research on fertility determinants. Many of the prospective policy reforms, however, could improve development prospects and allocative efficiency quite apart from their effect on fertility. Their demographic impacts would merely strengthen motivation for policy adoption. In this connection a high research priority would be to establish more secure empirical grounds for the effects on economic development from fertility decline and the factors associated with fertility decline. Recent worldwide experience of fertility change may provide the necessary data for this purpose. Such knowledge could provide motivation for a closer integration of development policy and population policy, to their mutual advantage.

An important aspect of modernization is the shift in specialization of production (broadly interpreted) from the household to the general economy. Becker (1960) has noted that there are no good substitutes for children but there may be many poor ones. As part of the great institution of reciprocal caring<sup>10</sup> that is the family, this is undoubtedly true of children. But as a source of material advantage, there may be adequate substitutes for the large family. A key to the demographic transition consistent with enhancing development prospects of present and future generations may be to find such substitutes. Given the low absolute return on children estimated in a number of studies (Cassen, 1976), the development of substitutes might not be as distant a possibility as it first appears, if properly pursued.

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<sup>10</sup>To use the phrase of Griliches (1974).

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RELATIONSHIPS OF RURAL DEVELOPMENT STRATEGIES TO HEALTH AND  
NUTRITIONAL STATUS: CONSEQUENCES FOR FERTILITY  
A STATE-OF-THE-ART PAPER

By

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If a direct relationship of the health status of mothers and young children to fertility can be assumed, (Park et al., 1979) the question for development planners and managers is then the impact of development strategies on health status, specifically the interrelated health, nutritional status, and survival of women of child-bearing age and their under-five children. In this paper a series of relationships linking fertility through health status to measurable outcomes of development strategies are explored, using a review of more than 120 references from all parts of the developing world. These relationships are summarized in Figure 1 and in the paragraphs which follow:

Health and Nutritional Status and Fertility

Maternal health status and child survival (0-4 years) are posited as the two major health factors influencing fertility, the former positively, the latter negatively. Their influence on fertility is no doubt mediated through the intermediate variables of Davis and Blake (1955): namely, the exposure to intercourse, influenced by child survival in societies with post-partum and lactational taboos; the exposure to conception, influenced by maternal health status, particularly the incidence of sterilizing diseases, and by child survival in societies where prolonged breastfeeding is practiced; and the outcome of gestation, influenced chiefly by maternal health status with particular reference to nutrition and the incidence and prevalence of abortion and stillbirth-causing diseases.

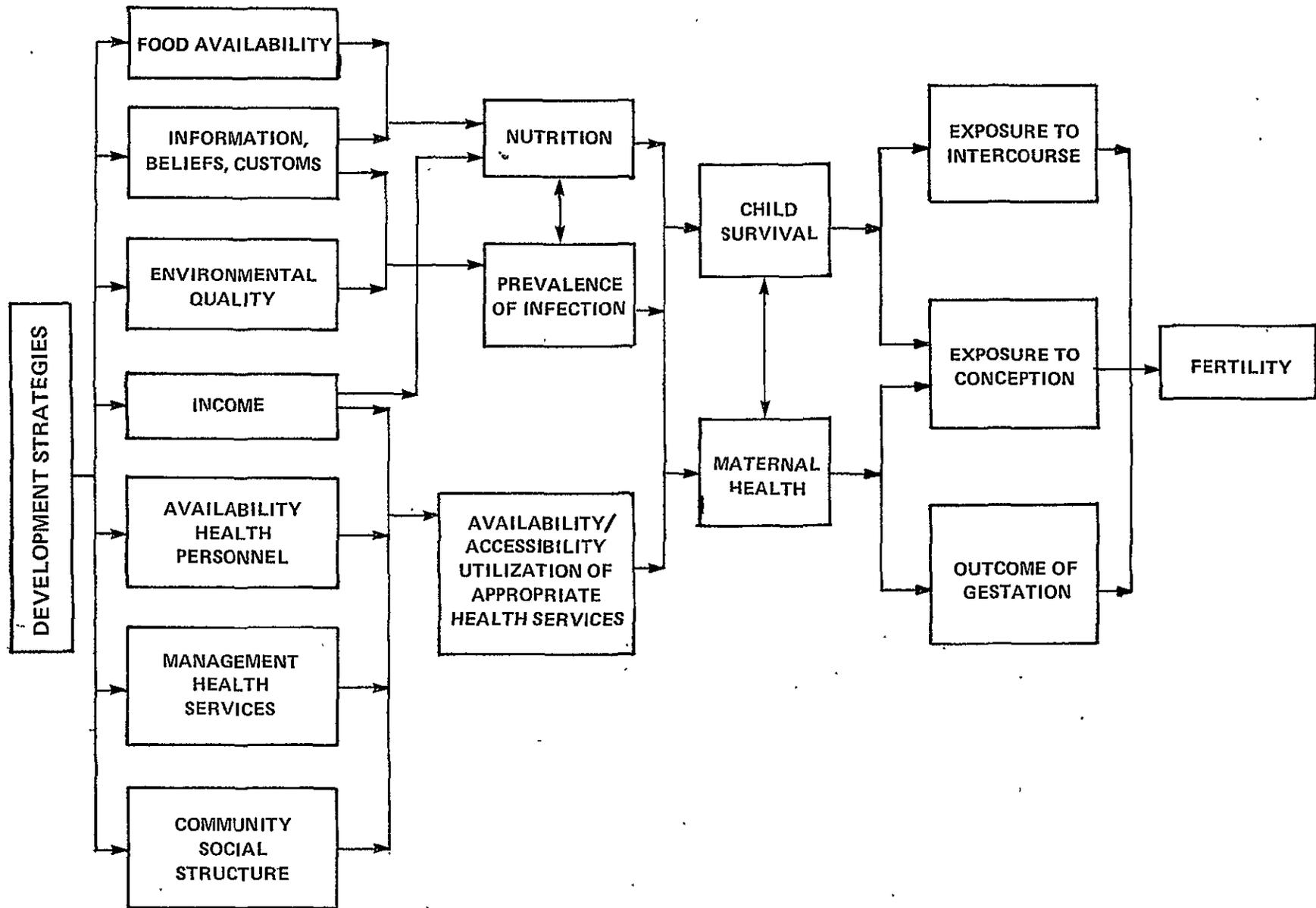


Figure 1. Relationships of development strategies to health determinants and health outcomes with consequent effects on fertility.

Women with improved nutrition are probably more fecund (Frisch, 1978) although severe degrees of malnutrition may be required to reduce fecundity (NRC, 1970), but are undoubtedly more fertile because of earlier menarche and delayed menopause (Frisch, 1978). In addition they have improved pregnancy outcomes because of heavier fetuses with a greater chance of survival (Naeye, 1973). At least a part of the effect of improved maternal nutrition is therefore exerted through improved child survival, but the overall effect seems to be an increase in fertility or at least an improved attainment of fertility goals (Hull, 1977).

The impact of improved child survival on fertility appears to occur largely through the effects of prolonged breastfeeding on ovulation, and of taboos on intercourse on pregnancy interval (Singarimbun and Hull, 1977). These biologic effects appear indisputable, but the role of psychological effects is much less clear. Do parents who experience improved child survival lower their fertility expectations? There is some evidence that this effect may hold true for some populations (Liu, 1972), but the effect appears to be delayed. Park et al. (1979) conclude that the total effect of infant death on national fertility may be minimal, less than three percent of total births, but that important micro level fertility effects must take place. The interplay of infant mortality with social and economic factors impinging on family size must also be taken into account. In any case, there is no country with a high infant mortality and low fertility rate (Birdsall, 1977).

Fertility itself also has reverse effects on health status of mothers and the survival of young children. In particular, parity rate and interpregnancy interval (Population Reports, 1975) appear to affect maternal health through increasing the complications of pregnancies, and aggravating underlying diseases (Wishik, 1974; Omran, 1974; Baskett, 1975). Maternal age also exerts a role in influencing the pregnancy complication rate (Eastman, 1940; Nortman, 1974).

Infant and child mortality rates rise after the fourth pregnancy, and child survival is shortened when the interpregnancy interval is less than two years (Population Reports, 1975). Widespread disregard of cultural taboos on intercourse during lactation is probably the chief contributor to this condition (Thompson and Rahman, 1967; Zempleni-Rabain, 1967, Hull, 1977).

#### Immediate Determinants of Health and Nutrition Status

Three major determinants emerge from the literature of the Developing World: nutrition, the prevalence and incidence of infections, and the availability, accessibility, and utilization of appropriate health services in decreasing order of importance.

Nutrition affects maternal health status in ways important for fertility by affecting fetal size and therefore survival, and pelvic size and therefore the ability to deliver vaginally (Thompson and Billewicz, 1963; Naeye, 1973). Two manifestations of maternal nutrition are significant: maternal height, a reflection of antecedent (premenarchal) nutrition, and weight gain in the third trimester of pregnancy, more a reflection of current diet.

Twenty-five percent of all childhood deaths (ages 1-4) in developing countries are due to some form of malnutrition, while over 50 percent may have malnutrition as a contributory cause (Morley, 1973). These statistics illustrate well the important role of nutrition in determining child survival. Nutrition, however, seems to act synergistically with infections in producing higher mortality rates (Scrimshaw et al., 1968), the latter affecting caloric loss because of vomiting, diarrhea, cough, or fever (McGregor, 1976).

Infections of seeming general importance to maternal health include malaria, schistosomiasis, venereal diseases and tuberculosis. In terms of implications for fertility, malaria acts to interfere with fetal growth and survival through invasion of the placenta as well (Cannon, 1958). Schistosomiasis poses a particular risk to women in some societies because of their multiple water-related activities:

water drawing, clothes washing, bathing children, and wetland rice cultivation. The health consequences may include anemia, weight loss, and anorexia, all having indirect implications for fertility, and in some women ovarian and endometrial lesions leading to impaired fertility. Venereal infections have well-known fertility implications: syphilis through its tendency to produce abortion and stillbirth (WHO, 1975), gonorrhea because of its propensity to inducing infertility through blocked fallopian tubes (Retel-Laurentin, 1974). Tuberculosis is an important contributor to morbidity and mortality in women of developing countries, and may result in infertility in some women by producing a tuberculosis salpingitis or endometritis (WHO, 1975).

The major infections of early childhood may be categorized according to their apparent synergistic action with undernutrition in diminishing child survival. In this way comprehensive approaches to the control of these diseases through development strategies may be visualized. If we assume that a diminution in infant and child mortality is one requisite for diminished fertility, these diseases must fall under the sway of development strategies if any fertility effects are to be realized.

The diarrhea and dysentery syndrome is the prototype condition employed by Scrimshaw et al., (1968) in their development of the concept of the synergism of nutrition and infection. Mention has already been made of the role of seasonality in determining the degree of impact of this syndrome on child growth and mortality (McGregor, 1976). In essence, the number days per year a young child spends with diarrhea, 72 according to Rowland's (1977) study in the Gambia is the major variable which may determine the effect on growth, and thereby on survival. Diarrhea and dysentery may thus be classified as having a highly synergistic relationship with nutrition by reason of reduced caloric intake and increased caloric loss. Lower respiratory infections, malaria, and pertussis all act in much the same way to interfere with caloric intake and to increase caloric dissipation.

Measles and tuberculosis too, act in conjunction with undernutrition to diminish child survival. Undernutrition on the one hand reduces cell-based immune defenses essential to preventing the ravages of these diseases (Chandra and Newberne, 1977). On the other hand, both diseases by means of caloric dissipation and reduced caloric intake, may lead to various grades of malnutrition.

Neonatal tetanus, the last of the major infections of young children to be considered here, seems to relate to nutrition less directly. In this case the infection itself is virulent enough to produce a high case mortality without the contribution of a malnourished state.

The third factor having an immediate determinative role in relation to maternal health and child survival is the availability and accessibility of health services, and the quality of those services, as reflected in their utilization and the appropriateness of their content and mode of delivery. Only indirect evidence bearing on the influence of these factors on maternal health status is available but seems to indicate that maternal mortality is lower and maternal health status better, where physician/nurse/hospital per population ratios are favorable (Bryant, 1969; United Nations, 1976). As for utilization one can only infer from the improved maternal mortality rates in villages where midwives were furnished with skills in aseptic delivery techniques, that utilization depends on available and accessible services in order to exert any effect on maternal health (Villod and Raybaud, 1965; Ampofo, 1975). Utilization is thus more of an outcome of the characteristics of health services than it is itself a characteristic of the services. The implication is that if maternity services are available, accessible, and of an appropriate character, they will be used and thereby exert an influence on maternal health.

The same contention can be made regarding the influence of these characteristics on child survival, except that the evidence is firmer, that where the

accent is put on combining preventive health and nutrition services, and utilizing auxiliary workers as the means for extending these services to populations, child mortality rates respond favorably (Satgé, 1970; Morley, 1968; Gwatkin, 1977; Department of International Health, 1978a).

#### Proximal Determinants of These Immediate Determinants of Maternal Health Status and Child Survival

In this section leverage points in the system upon which development strategies may exert their effect are identified. Seven points or variables are suggested:

- 1) Food availability
- 2) Information, beliefs, and customs
- 3) Environmental quality
- 4) Income
- 5) Management structure of health services
- 6) Health personnel supply
- 7) Community social structure.

#### Food Availability

One need only observe the seasonal variations in child growth and mortality and disease severity in many parts of the world (McGregor, 1976; Morley, 1968; Shiffman, 1976) to conclude that food availability is a major determinant of child survival, since the season of greatest risk is that time of year when food supplies are low. Food availability impinges on nutrition at two levels: the community level where such factors as agricultural production and productivity, market accessibility, and the social structure of the community play important roles; and the household, where it is more a matter of custom regarding intrafamilial distribution.

#### Information, Beliefs, Attitudes, and Practices

This group of interrelated factors appears to affect nutrition by means of influencing intrafamilial food distribution (Satgé, 1964), the prevalence and incidence of infections through their impact on personal hygiene (Ogionwo, 1973),

and on the utilization of health services (Becker, 1975; Parker et al., 1978) or on the local treatment of infection (Morley, 1967). These factors are subject to a variety of influences from development strategies, particularly those which alter social relationships (Herzog, 1975) or affect economic well-being (Department of International Health, 1978a).

#### Quality of the Environment Including the Social and Occupational

Three aspects of the physical environment are considered: water quantity and quality, sanitation, and housing quality. Water quantity appears to have as much to do with the control of infections as water quality (Feacham, 1977). Much gastrointestinal illness formerly considered due to specific water-borne pathogens is now known to respond to simply having larger volumes of water available at the household level (White et al., 1974). A previous generation's preoccupation with bacteriologic potability standards has given way to a comprehensive approach, embodying economic, technical, and socio-cultural criteria (World Bank, 1976).

Inadequate sanitation is related to diarrhea and dysentery and hookworm infection, but also to the prevalence of malaria and filariasis where facilities are either inadequately constructed or in disrepair. Small children pose a particular problem because they are frequently assumed to be noninfectious, and waste disposal facilities are not constructed so as to accommodate their using them.

Where communities have been mobilized to improve the sanitary environment, remarkable reductions in intestinal parasitic infection have been achieved (Flavier, 1970; Cunningham, 1970; Arole, 1972). On a larger scale in the Peoples Republic of China, widespread decentralized programs of sanitary disposal and reuse of human fecal material, protection of wells, and snail removal from canals and ponds, have brought many perennial disease problems under control (Horn, 1971). The World Bank is undertaking currently a worldwide study of low cost sanitation options (World Bank, 1978).

Housing, the third aspect of the physical environment to be considered, is much less discussed in the literature in relation to health status. What evidence is available seems to point to a key role in lower respiratory infections and tuberculosis (Morley, 1973). The number of persons per square meter of housing is apparently the key variable.

The social and occupational environment, particularly that of the mother may also impinge on both nutrition and the incidence and prevalence of infections. For example, in some societies mothers who carry their small children to the rice paddies may expose them to an increased risk of malaria (Cissé, 1967), but if they leave their infants in the village in the care of others, they are more likely to wean them early (Thompson and Rahman, 1967). If the mother is engaged in nonagricultural employment she is less likely to breastfeed, and likely to do so for a shorter duration (Butz and DeVanzo, 1977). Breastfeeding is in fact a key behavioral intermediate resulting from the influence of development strategies on the social and occupational environment, because it is a link between maternal nutrition and health, and that of the child, and because it makes great demands on the mother's energy, time, and spatial movements. Group norms also play an important role with regard to breastfeeding and pregnancy spacing. In many societies if a woman weans a child too early, she becomes an object of ridicule by her peers (Thompson and Rahman, 1967; Zempleni-Rabain, 1967).

#### Income

Income has a major relationship to nutrition and the utilization of health services, to nutrition, because households must frequently purchase food in times of shortage. Income appears however, to have little effect on nutrition if attention is not paid to food distribution (Gwatkin, 1978, Herzog, 1975). As for health services utilization, where health service coverage is inadequate income may prove to be a sizeable barrier to obtaining health care (Synchrisis, 1975). A comparison of selected Asian countries (See Table 3) with differing per capita GNP for example,

Table 3

POPULATION PER PHYSICIAN AND NURSE BY PER CAPITA GNP IN  
SELECTED ASIA COUNTRIES

Country	Per Capita <sup>a</sup> GNP in \$	Population <sup>b</sup> per Physician 1973 or 1974	Population <sup>b</sup> per Nurse*
Nepal	90	36,450	35,880
Pakistan	120	3,970	11,106
India	120	4,160	6,525
Indonesia	130	18,160	3,074
Thailand	270	8,530	4,069
Philippines	280	2,990	3,054
South Korea	400	1,940	201
Malaysia (West)	570	7,300	1,786
Hong Kong	1,430	1,560	1,331
Singapore	1,830	1,400	379

## Sources

<sup>a</sup> Overseas Development Council. The U.S. and World Development. New York: Praeger, 1976.

<sup>b</sup> World Health Statistics Report, Geneva: World Health Organization, 1976.

\* Includes all nurses in three categories: nurses, assistant nurses, and midwives and nursing auxiliaries.

reveals sharply differing numbers of population per type of health personnel, particularly nurses. Where deliberate attempts to distribute health care equitably have been made, however, income drops out as a significant factor (Gwatkin, 1978).

#### Management Structure of Health Services

Of particular importance to the availability, accessibility, and appropriateness of health services delivered to rural populations of developing countries, is the quality of management of those services at the local level. At this level the skills of management personnel need not be sophisticated, but should incorporate aspects of planning, evaluation, supervision, and fiscal accounting. To a very great degree, these skills are at present missing at the district level in most developing countries, and their introduction will be intimately dependent on the expansion of local government capacity in a more general sense (Rondinelli and Ruddle, 1977). Critical to the introduction of any innovation in management skills is the incorporation of the supervision of special health projects into the local management scheme from the very first (Isely, 1978).

#### Personnel Supply

Again this factor is critical to both the availability, accessibility, and appropriateness of health services. In most instances this personnel will be composed of medical and nursing auxiliaries (Habicht, 1973; Morley, 1973; Fendall, 1972; Department of International Health, 1978a). This type of personnel has been identified in fact as a key element determining the success of various health service interventions (Gwatkin, 1979). Another key element, the integration of health, nutrition, and family planning services, appears to depend squarely upon embodying both the concepts and practice of integration in personnel. Despite the problems involved, evidence seems to point to the potential benefits of such interventions if they can be achieved (Johnston and Meyer, 1977; Department of International Health, 1978a; Delgado, 1979).

## Community Social Structure

Understanding the social structure of a community is the first prerequisite to adapting health service delivery to local conditions. Social structure will have a major impact on distribution of income, goods and services in stratified societies such as India (Department of International Health, 1978a). In any society the structure by age, sex, caste, or other economic group will play a key role in shaping the type of community participation in health possible (Isely and Mvele, 1979).

## Implications of Development Strategies for Fertility via Health and Nutrition Status

How can rural development strategies be shaped so as to influence maximally the sequence of variables discussed above? Three types of approach to development were examined in order to assess their potential to development planners:

Development strategies using a participatory model.

Development strategies having increased agricultural production and productivity as a major objective.

Development strategies having increased income as a major objective.

Drawing heavily on the experiences of multiple health projects in developing countries but particularly the Narangwal (Department of International Health, 1978a, 1978b), Danfa (Asante, 1978), and African Regional Public Health Training Projects (Isely and Martin, 1977), and on the national or state experiences in Sri Lanka, China, Cuba, Tanzania, and Kerala, as well as on the thought-provoking reviews by Gwatkin et al., (1979), and Johnston and Meyer (1977), a tentative set of conclusions can be suggested to guide planners:

- 1) Participatory approaches appear to be essential ingredients in many successful development projects, and probably will eventually prove to be essential to achieving desired health, nutrition, and even fertility outcomes, but firm data as yet preclude making conclusive statements (Gwatkin, et al., 1979).

2) Increasing agricultural production and productivity depends for its impact on health, nutrition, and fertility, on at least two and possibly three factors. The first is the obvious need to equitably distribute the economic benefits of the increases (Department of International Health, 1978a). Secondly, the improvements in particularly productivity, must extend to the entire agricultural sector, including food production, the so-called "unimodal" development model (Johnston and Meyer, 1977). Thirdly, the health consequences of increasing agricultural production and productivity will be exceedingly slow in occurring unless specific programs of health, nutrition, and family planning services are integrated into the program as a part of its forward thrust (Johnson and Meyer, 1977). Thus the implications for health, nutrition, and fertility will be more rapidly realized if specific integrated health programs are included.

3) Raising income depends for its effect on the availability of food and health and educational services, dependent in turn on their equitable distribution. Where these benefits are distributed in a highly equitable fashion, as in Sri Lanka and Kerala (Gwatkin, et al., 1978) raising income does not seem to be necessary to achieve positive results in terms of health and fertility. Where equity of distribution is neglected, as in much of the world, income may be a significant factor especially if it has passed a certain critical threshold. In the study of Herzog (1975) in Senegal where raising income appeared to have no effect on health and survival, that threshold had probably not been reached.

A series of relationships leading to health outcomes in mothers and children and thence to implications for fertility has been examined. At certain leverage points in the system development strategies are seen to exert their influence. Three distinct approaches to rural development have been examined: participation, increasing agricultural production and productivity, and raising income. All are important to some degree in affecting health outcomes, but the evidence seems to be that raising income is the least important of the three. The effects of the

other two are dependent on certain conditions. Participatory approaches require adequate policy and management backup. Increasing agricultural production and productivity must be accompanied by an equitable distribution of technology and benefits and specific health, nutrition, and family planning programs.

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## General Analytical Framework

by  
Edward Vickery

### I. INTRODUCTION

#### Motivation for Presenting a General Analytical Framework

There are two common characteristics of the seven state-of-the-art papers (SOAPs) which comprise Phase I of this project. First is that they recognize the interdependency (or jointness) of fertility decisions and several other household decisions. In other words, decisions to have children involve implicit future commitments of time and money. These perceived commitments are often weighed against alternative uses of time and money. Such assessments mean that the decisionmakers are involved in judgements (usually subjective) about the relative net attractiveness of additional children versus additional durable goods, education, leisure time activities, and other trade-offs. Hence, an overall model of household decisionmaking, instead of simply a model of fertility behavior, is most appropriate on theoretical grounds.

Second is that all of the SOAPs contain the important insight that rural development activities (RDAs) rarely impact directly on fertility decisions. Instead, their impacts are transmitted by affecting one or more of the determinants of fertility decisions. Some of those determinates will be synonymous with or in competition with the other household decisions or alternatives which off-set fertility behavior.

But the point remains. The impact of RDAs on fertility must typically be observed indirectly, through their influences on the environment and options confronting households.

The foregoing conclusions suggest that a general framework of household decisionmaking must be specified in order to analyze the potential impact on fertility behavior of a particular RDA. The linkages between the various household decisions must be identified; the external (to the household) influences on those decisions must be specified. Only then can there be some hope of understanding the likely net impact of RDAs on fertility behavior since their impact will be transmitted indirectly by working through the matrix of influences on household decisionmaking.

The emphasis on household decisionmaking means that each SOAP can be considered as utilizing a variant of the general framework. It is equivalent to offering a modular approach. If a particular RDA is hypothesized to influence fertility decisions through only one type of change, e.g. improved nutrition practices, it will probably not be necessary to evaluate that project's indirect impact on fertility via changes in other household decisions, such as migration, on the other hand, if the RDA is a large multi-purpose project, the full household decisionmaking model would probably be required.

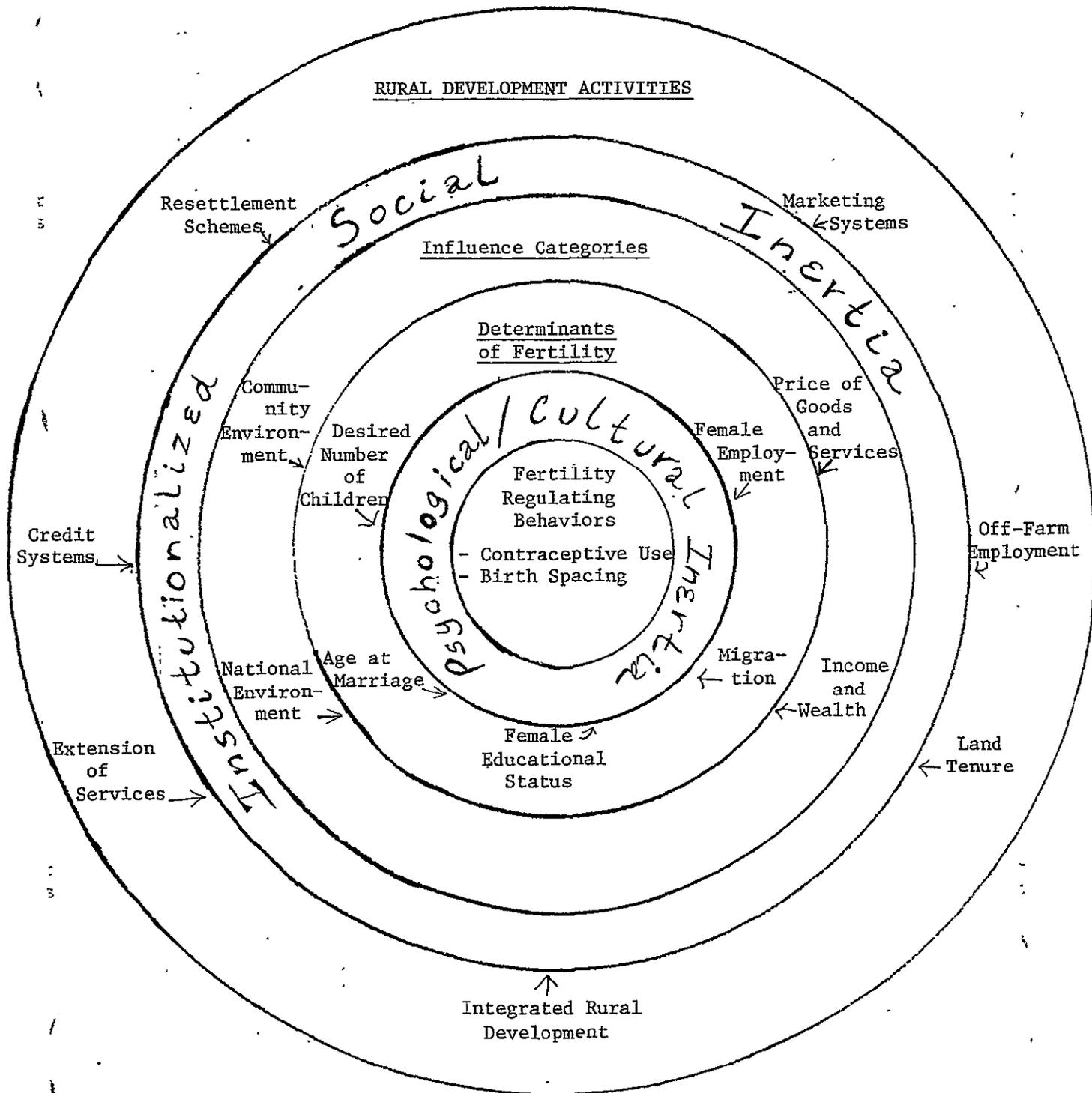
## Plan of the Presentation

As a preface to the presentation, Figure 2 and Tables 4-6 might prove to be helpful. The relationship between macro rural development programs, national and community factors and fertility through some of the variables discussed in the SOAPs is depicted as a series of concentric circles in Figure 2. Consistent with the two common characteristics of the SOAPs, any type of RDA is believed to impact first on one or more of five categories of "influences": income (I1); relative prices (I2); household tastes or preferences (I3); the community environment (I4); the national environment (I5). The resultant changes in these influences are believed to induce changes in three categories of household decisions: fertility and fertility control (D1); money and time allocations to child quality vs. non-child goods and services (D2); money and time allocations to adult quality vs. childbearing (D3). Tables 4-6 indicate the interactive nature of the household decisionmaking process by showing lines of influence from one category of household decision to the others.

The presentation of the general analytical framework consists of four parts. Part II is concerned with the fertility and fertility control decisions and how they are influenced. Part III is concerned with other household decisions (which interact with fertility decisions) and how they are influenced. Part IV gives examples of how six types of RDAs might influence fertility decisions, working through the household decisionmaking framework presented in Parts II and III.

Figure 2

General Model of Fertility Decision Making\*



\*This conceptualization was adapted from the Cost and Value of Children SOAP (Turchi and Bryant) by L. Zivetz.

Table 4

## Fertility and Fertility Control: Specification of Influences Which Determine Decisions

Decision Functions:  Influence Categories:	FERTILITY		FERTILITY CONTROL	
	(desired no. of surviving children) D1a	(birth spacing) D1b	(contraceptive use) D1c	(age at 1st marriage) D1d
<b>I1. INCOME AND WEALTH</b> I1a: women's earnings I1b: men's earnings I1c: children's earnings	I1a I1b I1c			I1a I1b
<b>I2. PRICES OF GOODS AND SERVICES</b> I2a: price index for schooling I2b: price index for durable goods I2c: interest rate/borrowing terms	I2a I2b			
<b>I3. HOUSEHOLD TASTES/PREFERENCES</b> I3a: family or marriage type I3b: religion or religiosity I3c: education attainment I3d: age I3e: experience with child mortality I3f: family status or prestige I3g: son preference I3h: perceived status of women		I3a I3b I3c I3d I3e I3f I3g I3h	I3b I3c I3d I3e I3f I3g I3h	I3c
<b>I4. COMMUNITY ENVIRONMENT</b> I4a: index of trad. vs. modern attitudes I4b: access to land/other resources I4c: person-land ratio or size of typical land holding I4d: avail. of family plan. advice and modern contraceptives I4e: avail. of modern health facilities I4f: inheritance system I4g: index of community attitudes toward women's roles I4h: avail. of telephone service I4i: transportation rates I4j: food availability I4k: friends/relatives in other community I4l: improved data about job opportunities I4m: distance to nearest major urban area	I4a I4b I4c I4d I4e I4f I4g I4h I4i I4j I4k I4l I4m	I4a I4e	I4a I4d I4g	I4a I4b I4c I4f I4g
<b>I5. NATIONAL ENVIRONMENT</b> I5a: tax rate on rural producers I5b: foreign exchange premium				
<b>D1. FERTILITY AND FERTILITY CONTROL DECISIONS</b> D1a: desired no. of surviv. children D1b: birth spacing D1c: contraceptive use D1d: age at first marriage		D1a D1c D1d	D1a	D1a
<b>D2. ALLOCATIONS TO CHILD QUALITY vs. NON-CHILD GOODS AND SERVICES</b> D2a: invest. in child quality: education D2b: use appropriate medical/nutritional practices for maternal/child care D2c: invest. in durables/savings		D2b D2c		D2c
<b>D3. ALLOCATION TO ADULT QUALITY vs. CHILDBEARING</b> D3a: added education/training: women D3b: off-farm employment: women D3c: migration to another community	D3a D3b D3c	D3a D3b	D3a D3c	D3b D3c

Note that decision D1d is determined by influences which existed prior to the act of marriage. Consequently, the elements shown in column D1d refer to values which were current at the date of marriage.

Table 5

Money/Time Allocations to Child Quality vs. Non-Child Goods: Specification  
of The Influences Which Determine Decisions

Decision Functions:  Influence Categories:	CHILD QUALITY		NON-CHILD GOODS
	(invest in education) D2a	(use appropriate medical/nutritional practices) D2b	(invest in durables/ savings) D2c
<b>I1. INCOME AND WEALTH</b>			
I1a: women's earnings	I1a	I1a	I1a
I1b: men's earnings	I1b	I1b	I1b
I1c: children's earnings	I1c	I1c	
<b>I2. PRICES OF GOODS AND SERVICES</b>			
I2a: price index for schooling	I2a	I2a	I2a
I2b: price index for durable goods	I2b	I2b	I2b
I2c: interest rate/borrowing terms			I2c
<b>I3. HOUSEHOLD TASTES/PREFERENCES</b>			
I3a: family or marriage type	I3a		
I3b: religion or religiosity	I3b		
I3c: education attainment	I3c	I3c	I3c
I3d: age		I3d	I3d
I3e: experience with child mortality		I3e	
I3f: family status or prestige	I3f		I3f
I3g: son preference			I3g
I3h: perceived status of women			I3h
<b>I4. COMMUNITY ENVIRONMENT</b>			
I4a: index of trad. vs. modern attitudes	I4a	I4a	I4a
I4b: access to land/other resources	I4b		I4b
I4c: person-land ratio or size of typical land holding	I4c		I4c
I4d: avail. of family plan. advice and modern contraceptives	I4d	I4d	
I4e: avail. of modern health facilities		I4e	
I4f: inheritance system			
I4g: index of community attitudes toward women's roles	I4g		I4g
I4h: avail. of telephone service			
I4i: transportation rates			
I4j: food availability		I4j	
I4k: friends/relatives in other community			
I4l: improved data about job opportunities			
I4m: distance to nearest major urban area			
<b>I5. NATIONAL ENVIRONMENT</b>			
I5a: tax rate on rural producers			I5a
I5b: foreign exchange premium			I5b
<b>D1. FERTILITY AND FERTILITY CONTROL DECISIONS</b>			
D1a: desired no. of surviv. children	D1a	D1a	
D1b: birth spacing			D1b
D1c: contraceptive use			
D1d: age at first marriage			
<b>D2. ALLOCATIONS TO CHILD QUALITY vs. NON-CHILD GOODS AND SERVICES</b>			
D2a: invest. in child quality: education			D2a
D2b: use appropriate medical/nutritional practices for maternal/child care	D2b	D2b	D2b
D2c: invest. in durables/savings	D2c	D2c	
<b>D3. ALLOCATION TO ADULT QUALITY vs. CHILDBEARING</b>			
D3a: added education/training: women	D3a		D3a
D3b: off-farm employment: women	D3b		D3b
D3c: migration to another community	D3c	D3c	D3c

Table 6

Money/Time Allocations to Child Quality vs. Non-Child Goods: Specification  
of The Influences Which Determine Decisions

Decision Functions:  Influence Categories:	EDUCATION	MODERN EMPLOYMENT	MIGRATION
	(added educ. or traing. for women) D3a	(off-farm empl. for women) D3b	(migration to another community) D3c
<b>I1. INCOME AND WEALTH</b>			
I1a: women's earnings	I1a	I1a	I1a
I1b: men's earnings	I1b	I1b	I1b
I1c: children's earnings			
<b>I2. PRICES OF GOODS AND SERVICES</b>			
I2a: price index for schooling			
I2b: price index for durable goods			
I2c: interest rate/borrowing terms			
<b>I3. HOUSEHOLD TASTES/PREFERENCES</b>			
I3a: family or marriage type	I3a	I3a	I3a
I3b: religion or religiosity			
I3c: education attainment	I3c	I3c	I3c
I3d: age	I3d	I3d	I3d
I3e: experience with child mortality			
I3f: family status or prestige	I3f	I3f	I3f
I3g: son preference			
I3h: perceived status of women	I3h	I3h	
<b>I4. COMMUNITY ENVIRONMENT</b>			
I4a: index of trad. vs. modern attitudes		I4a	I4a
I4b: access to land/other resources		I4b	I4b
I4c: person-land ratio or size of typical land holding		I4c	I4c
I4d: avail. of family plan. advice and modern contraceptives			
I4e: avail. of modern health facilities			I4e
I4f: inheritance system			I4f
I4g: index of community attitudes toward women's roles	I4g	I4g	I4g
I4h: avail. of telephone service			I4h
I4i: transportation rates			I4i
I4j: food availability			
I4k: friends/relatives in other community			I4k
I4l: improved data about job opportunities	I4l		I4l
I4m: distance to nearest major urban area			I4m
<b>I5. NATIONAL ENVIRONMENT</b>			
I5a: tax rate on rural producers			
I5b: foreign exchange premium			
<b>D1. FERTILITY AND FERTILITY CONTROL DECISIONS</b>			
D1a: desired no. of surviv. children	D1a	D1a	D1a
D1b: birth spacing	D1b	D1b	D1b
D1c: contraceptive use			
D1d: age at first marriage	D1d	D1d	
<b>D2. ALLOCATIONS TO CHILD QUALITY vs. NON-CHILD GOODS AND SERVICES</b>			
D2a: invest. in child quality: education			
D2b: use appropriate medical/nutritional practices for maternal/child care			
D2c: invest. in durables/savings			
<b>D3. ALLOCATION TO ADULT QUALITY vs. CHILDBEARING</b>			
D3a: added education/training: women		D3a	
D3b: off-farm employment: women			
D3c: migration to another community	D3c	D3c	

## II. FERTILITY AND FERTILITY CONTROL DECISIONS

### Household Decisions which Directly Affect Fertility

The SOAPs indicate that there are two basic types of fertility decisions\* made by households:

Dla: desired number of surviving children--Economists will recognize this as equivalent to their concept of the "demand" for children. The emphasis is on surviving children, not live births. This decision represents a long-run equilibrium objective which, according to the literature, shows a tendency to be modified over time depending on whether parents' actual experience of raising children yields the net benefits originally perceived.

Dlb: birth spacing--This decision is equivalent to the "supply" of children over time. It represents how rapidly the couple decides to attain their desired number of surviving children.

The above fertility decisions are viewed by the SOAPs as being directly affected by two types of fertility control decisions:

Dlc: contraceptive use--This concept encompasses decisions to use the most traditional form (abstinence) as well as the more modern contraceptive devices. It also includes abortions. Obviously, more continuous use of modern contraceptives is associated with lower fertility.

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\*This decisionmaking framework even applies to households which are infertile, since the possibility and fact adoption or raising the children of relatives exist.

Dld: age at first marriage--The literature considers this decision to be the most obvious type of exposure to the risk of pregnancy. In some regions, South America in particular, the definition of marriage must be broadened to include consensual unions. The literature finds that higher ages of first marriage are consistent with lower fertility.

Household decisions D1-D4 represent that set of fertility and fertility control decisions which are the targets for impact by RDAs. To ascertain more clearly how to hit that target, it is necessary to specify these decisions as functions of the influences described below.

#### Household Decisions as Functions of Six Categories of Influences

The combined testimony of the SOAPs advances the hypothesis that household decisions D1a-D1d are functions of (i.e. determined by) six categories of influences. These categories are defined below, where symbol I1 denotes the income and wealth influence category, etc.:

I1: income and wealth--This category is one of the SOAP topics.

Income/wealth is a pervasive influence which seems to affect most decisions made by households. With regard to fertility decisions, it is important to know which household members receive the income. Increased income is hypothesized in several of the SOAPs to have its most significant impact on reducing fertility if the income recipients are women. An increase in women's wages

increases the cost of their time and leads to a reduction of childbearing, a time-intensive activity with no monetary compensation. Children's wages, of course, act in the opposite direction, tending to increase fertility. The strength of the income/wealth influence will vary over the life cycle, which observation applies to all other influences as well.

I2: prices of goods and services--Prices represent externally imposed constraints to the household's objective of maximizing its overall welfare within the limits of its available income and time. An increase in the prices of goods and services which are involved in having and raising children (i.e. an increase relative to prices of other goods and services) would, according to the Income SOAP, tend to have the effect of reducing fertility. The interest rate is a price of particular concern, since it signals both the return to financial assets and the cost of capital.

I3: household tastes or preferences--This category of influence is hypothesized in the SOAPs to be composed of (but not necessarily limited to) the following mix of individual characteristics and experiences:

- a. family and marriage types;
- b. religion and religiosity;
- c. education attainment (a SOAP topic);
- d. age;

- e. experience with child mortality;
- f. family status or prestige;
- g. son preference;
- h. women's perceived status.

These kinds of cultural and social influences are believed to be important moulders of knowledge, attitudes, and practices affecting fertility and fertility control decisions. As the SOAPs indicate, the relative importance of these characteristics and experiences in shaping household tastes or preferences will obviously vary from one area to another, and over time as households move through the life cycle.

I4: community environment--Immediate environmental quality and characteristics make up this category of influences. They are important conditioners of individual tastes or preferences, but slightly less personal than the types of influences listed in category I3. In other words, like the externally imposed prices of category I2, other community factors represent the inherited knowledge, attitudes, and practices of the immediate environment where the household is located. The SOAPs hypothesize that the following community factors should be considered to be important influences on fertility and fertility regulation decisions:

- a. prevalence of traditional versus modern community attitudes;
- b. access to land, capital, and other resources (part of the Land Tenure SOAP);
- c. person-land ratio and size of typical land holdings (part of the Land Tenure SOAP);
- d. availability of family planning information and modern contraceptives;
- e. availability of health facilities (part of the Health and Nutrition SOAP);
- f. inheritance system (part of the Land Tenure SOAP);
- g. community attitudes toward women's economic roles and women's access to resources and jobs (part of the Role of Women SOAP);
- h. availability of telephone communications;
- i. availability of good quality roads to main highways.

Any other characteristics which distinguish one community from another could be added to the above list if they seem to be especially relevant to the decisions being made by households.

I5: national environment--Still another set of conditioning influences on individual tastes or preferences involves the national or macro environment. The literature testifies to the importance of the two influences listed below. These are meant to be illustrative of this category, not exhaustive:

- a. taxation structure and other incentives or disincentives to achieving higher economic productivity;
- b. premium paid for and availability of foreign currency.

### Other Household Decisions

The decisions listed below, all of which represent SOAP topics, seem to be the set of other household decisions which impinge most obviously on fertility decisions:

D2: Allocations to child quality vs. non-child goods and services.

D2a: Investments in child quality, especially education;

D2b: Use of appropriate medical and nutritional practices for maternal and child health;

D2c: Investment in other types (non-child) of goods and services;

D3: Allocations to adult quality vs. childbearing.

D3a: Additional education/training for adults;

D3b: Women's participation in off-farm labor force;

D3c: Migration to another community

In the next part of the paper, the influences on these other household decisions will also be explored. At this point, however, they are of interest only as influences on the fertility and fertility control decisions.

## An Overview of Influences on Fertility and Fertility Control Decisions

The elements of these categories I1-I5 that influence decisions D1a-D1d are illustrated in Table 4. The columns labeled D1a and D1b represent the two types of fertility decisions, while D1c and D1d represent the two fertility control decisions. The five influence categories are listed down the left margin of Table 4. Each category contains two or more elements (or potentially measurable variables) which are hypothesized by the SOAPs to influence decisions D1a-D1d. A judgement that a particular influence variable is likely to influence a particular decision is indicated by the appropriate symbol (e.g., I3d for age) placed in the column of the relevant decision functions, D1a-D1d.

Note in Table 4-5 the relatively greater importance of influence categories I1 and I2 (income/wealth and relative prices) in decisions D1a (desired number of surviving children) and D1d (age at first marriage) compared with decisions D1b (birth spacing) and D1c (contraceptive use). This emphasis is due to the postulated dominance of economic considerations in determining long-run demand for children and the timing of marriage. For decisions D1c and D1d, sociological and environmental influences are believed to deserve relatively greater emphasis.

The reason columns D1a-D1d are referred to as "decision functions" is that the SOAPs (and the literature they represent) emphasize that fertility and fertility control decisions are functions of (are determined by) the collection of influences summarized in Table 4. Such decisions cannot be legislated or decreed; they must be induced voluntarily through the decisionmaking processes of each household. It is for this reason that the emphasis herein is on the indirect influence of RDAs on fertility and fertility regulation decisions. The impact of any RDA must be realized in two or even three stages: first, by affecting one or more of the elements which influence decisions D1a-D1d; second, by the effect that changes in those particular elements have on the decisionmakers. The third stage is the interactions among the various decisions which the household members are continuously making.

These interaction effects are represented in Table 4 by the extent to which decisions D1a-D1d are believed to be affected by elements in the sixth influence category. To begin with, decisions D1a-D1d influence each other, according to the literature surveyed by the SOAPs. They are hypothesized to be further influenced by varying combinations of other household decisions, D2-D3. This "third stage", therefore, provides an influence path for RDAs through the mechanism of other household decisions. The next part of the paper summarizes the various influences on decisions D2-D3 in an attempt to sketch how such decisions might be affected by RDAs.

### III. OTHER HOUSEHOLD DECISIONS

#### D2: Money and Time Allocations to Child Quality versus Non-Child Goods

The SOAPS most concerned with these types of decisions are education, cost/value of children, income/wealth, and health/nutrition. They call attention to the tradeoffs between not only quantity vs. quality of children, but also expenditures on children vs. durables and savings. Once again, the interdependencies among various household decisions are underlined. Each of these decisions represents a form of investment, as noted below:

#### D2a: investments in child quality: education--The crucial insight

gleaned from the Cost/Value of Children SOAP is that both costs and values of children are decision variables. They are not like prices, which are externally imposed on the household. Rather, the household must decide (in light of its knowledge about prices) how much of its available time and money to allocate to children. The prime representative of decisions to invest in higher child quality is education. It prevents children from being available as labor inputs and increases the probability of their migrating to an urban area. But the perceived returns may be high in the forms of old age security and household pride in children's achievements.

#### D2b: use of appropriate practices for maternal/child health and

nutrition--These two closely related decisions represent not only another form of investment in child quality, but also investment in the welfare of the mother. Since higher allocations of time

and money are involved in households' decisions to opt for better maternal/child health and nutrition practices, such decisions compete with child quantity decisions and complement other child quality decisions.

D2c: investments in durables or savings--The Income/Wealth SOAP

hypothesizes that households choose the combination of child quantity, child quality, and non-child expenditures that maximizes utility subject to the constraints of household income/wealth and externally determined prices. This view is consistent with that of the Cost/Value of Children SOAP. Although there are clearly some aspects of expenditures on durable goods and savings which complement (rather than compete with) expenditures on child quantity or quality, their immediate impact is to reduce the resources available for the latter. Hence, decisions D2a and D2b are viewed by the SOAPs as essentially competitive with decision D2c.

The same six categories of influences which were defined for the fertility and fertility control decisions also apply to decisions D2a-D2c. Such is the generality of the household decisionmaking model recommended in this paper. In other words those six categories--income and wealth, relative prices, tastes and preferences, community environment, national environment, other household decisions--represent an exhaustive set of influences which, in varying degrees, affect all household decisions.

The elements of these categories I1-I5 that influence decisions D2a-D2c are illustrated in Table 5. The columns labeled D2a and D2b represent the two main investments in child quality (education and medical/nutritional practices), while column D2c represents the directly competing decision to invest in non-child good (durables or savings). The five influence categories are listed down the left margin of Table 5. The list of elements in each category is identical to Table 4.

Since these three decisions interact so closely, they tend to be influenced by many of the same types of elements. The discussion in the individual SOAPs add subtlety and precision in defining operational hypotheses regarding patterns of influence on decisions D2a-D2c.

However, the main message should be clear: these decisions represent the major tradeoffs made by households when weighing the net benefits of investing time and money in child quality versus non-child goods and services. Increased allocations of time and money to any of decisions D2a-D2c tends to be directly competitive with child quantity decisions. Thus, higher levels of investment in children's education, improved health, or durables/savings will act to decrease fertility and increase fertility control.

### D3: Money and Time Allocations to Adult Quality vs. Childbearing

Another set of decisions which compete with childbearing is that involving investments in adult quality (or quality-of-life). The three SOAPs which are most concerned with such decisions are education, the

role of women, and migration. Similar to the foregoing discussion of money and time allocations to child quality vs. non-child goods, the adult quality decisions involve conflicts and tradeoffs with fertility and other household decisions.

D3a: additional education/training for women--The Education SOAP testifies to the critical role played by educational attainment in shaping fertility and fertility control decisions, attitudes toward tradeoffs between child quantity vs. child quality, and options for women's labor force participation. Higher levels of education for women are associated with lower-levels of fertility, increased investments in child and adult quality, and greater labor force participation. Decisions to increase the level of educational attainment (even non-formal vocational training) seem to accentuate these central tendencies.

D3b: off-farm employment for women--The Role of Women SOAP underlines the evidence that traditional (especially subsistence agriculture) forms of labor force participation do not appear to be associated with fertility reduction. Rather, it is off-farm employment, whether urban or rural, which appears to induce lower levels of fertility.

D3c: migration--The Migration SOAP presents this decision as search for not only economic gain but also a more appropriate quality of life. Consequently, the migration decision is believed to affect fertility in a variety of ways including delay of marriage, exposure to a more modern urban environment, and enhanced upward social, educational, and occupational mobility.

As with the other household decisions, the same six categories of influences presented previously are postulated to determine the adult quality decisions. The elements of these categories I1-I5 that influence decisions D3a-D3c are illustrated in Table 6. Column D3a represents the decision function for additional education/training for women; column D3b for off-farm employment for women; and column D3c for migration. As with Tables 4 and 5, the five influence categories are listed down the left margin of Table 6. The presence in columns D3a-D3c symbol for a particular element indicates that the element is believed to influence that decision.

Note in column D3a of Table 6 that women's decisions to seek added education or training are hypothesized to be influenced primarily by economic motives. A similar conclusion emerges from examination of columns D3b and D3c regarding decisions in favor of off-farm employment and migration. Because of the competitive nature of these three decisions with respect to fertility decisions, they are shown to interact with decisions D1a, D1b, and D1d. Note also the conditioning role assumed for household tastes and preferences in all of these

decisions, and the importance of community environmental influences on migration decisions.

Special mention should be made of another type of household decision which might deserve inclusion in the above list: decisions to participate in community development activities. When household members decide to invest their time in such activities, it may have some impact on fertility and fertility control decisions. First, when women make such decisions, it enhances their perception of control over their lives. Second, the investment of time in influencing the quality of life within the community might spread to analogous fertility control decisions within the household. Third, increased commitment to the community will probably inhibit out-migration. The effects of this type of decision are considered in Part IV, since citizen participation represents one of the high priority RDAs.

#### IV. HOW RURAL DEVELOPMENT ACTIVITIES INFLUENCE FERTILITY DECISIONS

There are six categories of rural development activities (RDAs) which have been assigned high priority by AID and which are perceived to be managerially manipulable by means of policy instruments and/or program interventions:

- o Participation of the rural poor in the design, financing and implementation of rural development projects, as well as other projects aimed at achieving more equitable participation in the benefits of development, is envisaged here.
- o Extension of social service activities implies the extension of health care, education, and welfare services in rural areas.
- o Rural marketing systems focus on extending marketing infrastructure, including agricultural co-ops, roads, and storage facilities, to rural people.
- o Area development focuses on regional problems and potentials and on projects which are multi-purpose and affecting many communities.
- o Rural financial markets concern credit extension to farmers, co-ops, small scale industry as well as economic planning in rural areas.

- o Off-farm employment concerns labor force participation opportunities generated by small scale industry, craft cooperatives, or other activities, especially for women.

In Part I the assertion was made that RDAs will typically not impact directly on decisions regarding fertility or fertility control. Rather, their impact will be transmitted through one or more of the six influence categories defined in Parts II and III. The analysis of how a particular type of RDA might affect fertility behavior must proceed by means of a three-stage procedure:

- (1) identification of the types of outcomes to be expected from the rural development activity;
- (2) judgement about how each such outcome might affect one of the influence variables in the overall model;
- (3) estimation of the net affect on fertility decisions when the impacts are transmitted through the interrelated system described in Tables 4, 5, and 6.

The objective in this part of the paper is to provide examples of how to apply steps (1)-(3) in assessing the potential impact of RDAs which represent the six high priority activities listed above.

#### Participation of the Rural Poor

One of the most familiar types of participation activities in rural areas is the provision of self-help labor. Most of the developing countries implement some RDAs (especially the construction

component) using inputs of self-help labor from the rural communities which will be affected by the project. The assembling of self-help labor requires acquiescence by citizens of the community in the call for volunteer labor and, therefore, serves as a frequently encountered example of "participation".

The ultimate impact on fertility behavior depends upon the objective of the self-help activity. Consider two examples, construction of an elementary school in a difficult-to-reach rural community and construction of an all-weather road to that same community.

1. the school--this activity should definitely impact on fertility behavior as sketched below:
  - a. The construction of a school will serve to lower the perceived time and (perhaps) money costs of sending children to school, since previously the children have had to travel to neighboring communities for schooling. This means that influence element I2a in Table 5 will fall relative to other prices.
  - b. The reduction in perceived costs of children's schooling will tend to attract some households to opt for increased school attendance by their children (i.e. allow more children to attend school, or allow a particular child to remain in school for more years). In the context of Table 5, the relative decline in influence element I2a will tend to induce an increase in decision D2a.

- c. The increased school attendance will typically yield higher educational attainment for those children, which in itself will tend to reduce fertility in the long run (during their fertile years). This will come about by means of a rise in influence element I3c which, according to Table 4, affects all the fertility and fertility control decisions. Based on the SOAPs, an increase in I3c will generally cause decreases over time in D1a (desired number of surviving children), a lengthening of D1b (birth spacing), a rise in D1c (contraceptive use), and a rise in D1d (age at first marriage). Of course, the rise in I3c will also influence other household decisions, D2a-D2c, and the resulting indirect or interactive effects from these decisions on decisions D1a-D1d will tend to reinforce the conclusion regarding decreased fertility.
- d. If adult education programs are given in the school, attendance by adults may result in the acquisition of new skills (e.g., basic literacy) which could lead to increased productivity of rural producers. The resultant higher income will tend to marginally increase fertility if the income recipients are males, and to decrease fertility if the recipients are females. These conclusions flow from an analysis of Table 4-6 when a rise occurs in influence elements I1a or I1b.

2. the road--this activity might have the following types of impact on fertility:

- a. The new road will clearly reduce transportation costs (influence element I4i) for production inputs, consumer goods, and final outputs. The resultant rise in income or influence elements I1a, I1b, and (to a lesser extent) I1c will tend to affect almost all household decisions D1-D3. The on-balance impact will be difficult to predict without knowing which types of rural residents will be most likely to receive the benefits of reduced transport charges.
  
- b. In addition the all-weather road will be likely to improve access to health clinics and other social services in neighboring communities (influence elements I4d, I4e) and to provide better information about job opportunities and the presence of friends and relatives in potential receiving areas for out-migrants (influence elements I4k, I4l). Without knowing a considerable amount about the particular community in question, however, it will be rather difficult to predict the net impact from these improvements on fertility. First, if the community now has high mortality and morbidity rates due to non-existent health care, the improved access to health facilities will probably generate a short-run increase in the actual number of surviving

children-ever-born. Second, while the improvements may lead to some increase in net out-migration in the short run, if the improved access makes this particular community a more attractive residential area (e.g., only a short ride from a major city), than net in-migration might be realized in the longer-run.

These examples suggest that, while in some situations an accurate judgement about the net impact on fertility behavior from a given RDA is possible without knowing about the characteristics of the affected area, in most instances that will not be the case. Knowledge of the community environment, the types of individuals who will be affected, and other details will be necessary inputs for making that judgement. For any type of RDA, a proper assessment of the population impact will carefully consider the people and the environment being affected and will explicitly include these in the analysis suggest by Parts II and III.

#### Extension of Social Service Activities

The likely impact of one type of social service RDA--new schools--was examined under participation above. There will probably be a more complex impact on fertility and fertility control if the extension of social services is implemented even partially through self-help participation, as opposed to total financing by resources external to the community. The rationale for this conclusion was provided in the final paragraph of Part III (in the discussion of the fertility implications of household decisions to participate in community development).

Provision of health and family planning clinics represents, along with schools, perhaps the most common type of social service extension. The fertility implications of providing additional health/family planning clinics can be assessed by means of influence elements I4d and I4e. Tables 4-6 suggest that those influence elements directly effect fertility control decisions D1c (contraceptive use) child quality decision D2b (use appropriate medical/nutritional practices), and migration decision D3c. Those decisions then influence decisions D1a, D1b, D2a, D2c, D3a and D3a. The net result, according to the evidence from the SOAPs should be reduced fertility due to increased fertility control and reduced child mortality. While the strength of this net fertility reduction can be expected to vary from one community to another, the general direction of influence ought to be constant: toward lower levels of desired and actual family sizes.

#### Rural Marketing Systems

The typical pattern of influence for this type of RDA will be that described previously for the "new road" case under participation of the rural poor. Generally speaking, the greatest impact of rural marketing RDAs will be on the incomes of rural producers. The resultant influence on fertility will be difficult to predict without detailed analysis of community environmental characteristics, who the income recipients are, and so forth.

#### Area Development

The assessment of the fertility impact for this type of RDA begins with disaggregating the whole into its major components. If those components turn out to be representatives of the other five types of RDAs being discussed in this part of the paper, then the analysis of each component can proceed according to the advice being given here. If some other type of RDAs are involved--rural electrification, for example--the procedure should be as follows. First, specify what influences among those listed in Tables 4-6 might be directly affected by that component of the area development RDA. Second, outline the likely influences on other household decisions, fertility control, and fertility that seem to be implied from Tables 4-6 and the more detailed analyses provided in the relevant SOAPs. Finally, the sum of all these analyses of the various components will yield the total expected fertility impact of the area development RDA.

#### Rural Financial Markets

These types of RDAs will impact almost entirely on influence elements I1a (women's earnings), I1b (men's earnings), I2c (interest rate/borrowing terms), and I4b (access to land/other resources). Thus, the same problems are encountered as for any change which affects income. Since increased income received by females will tend to affect fertility differently from increased income received by males, the

analyst must take care to learn who the beneficiaries of the improved rural financial markets might be. Further, different types of community environments will mean different levels of response to changes in the efficiency of financial markets. Relatively more market-oriented rural producers will be more likely to respond significantly, while subsistence producers will tend to be less responsive.

#### Off-Farm Employment

This type of RDA is equivalent to decision D3b in the context of Tables 4-6. Consequently, any component of an RDA which creates off-farm employment opportunities can be analysed by means of the decision function D3b. As emphasized in the Role of Women SOAP, increases in off-farm employment opportunities for women are likely to lead to decreases in fertility.

#### Concluding Comments

The examples presented in this part of the paper are not intended to be followed slavishly. Rather, they are offered as illustrations of how to use the general analytical framework of Parts II and III to assess the likely fertility impact of RDAs. The message is that the combination of the general analytical framework and the detailed commentaries in the SOAPs should provide useful insights into the directional impact of influences on fertility and fertility control.

During the remainder of the Rural Development/Fertility Project, more precision should be achieved through the various case studies. The ultimate objective is to be able to suggest not only the direction of fertility influence, but also something about the strength of that influence. These refinements will be incorporated into the Assessment Techniques Guidebook, one of the final outputs from this activity.