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Rural Development, Education and Fertility: A State-of-the-Arts Paper

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**Conducted by
Research Triangle Institute
and
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RURAL DEVELOPMENT, EDUCATION AND FERTILITY:
A STATE-OF-THE-ARTS PAPER

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PREFACE

The authors wish to acknowledge at the outset the gracious assistance of USAID in providing necessary materials. Extensive use was made of existing literature searches. The work of Susan Cochrane proved especially helpful. Readers desiring a discussion of methodological questions and comparability of studies are referred to her erstwhile work. In seeking to provide mission Rural Development Officers with as straightforward an understanding of the relationship between rural development and human fertility as possible, methodological matters have been kept at an absolute minimum.

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.

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The SOAPS reflect the comments of the review panel: however, responsibility for content rests with the authors.

INTRODUCTION

Curbing high fertility rates is one of the most important problems that the less developed countries of the world must overcome as they strive toward achieving the goal of sustained social and economic progress. It is imperative for those who are in policy making positions in these countries to understand the complexity of the problem as well as alternative courses of action that may be taken to overcome it. This understanding can be facilitated through an examination of the available evidence on those factors which either act to promote or discourage increased human reproductive behavior.

Since most of the less developed countries are rural in character, unraveling the complex and dynamic relationships between rural development processes and fertility behavior should promote a better understanding of and explanation for differential rates of fertility within and among these countries. The possibility that the successful completion of such a task may generate a firm foundation for the refinement and/or establishment of developmental and population policies directed toward achieving more desirable fertility rates would seem to be profound.

This task, however, is a complicated one given the apparent indirect nature of the relationships between rural development processes and fertility behavior. This means that one must necessarily take into account the impact that rural development processes have on fertility via a variety of social, economic, cultural, psychological, and biological variables which tend to have a more direct and immediate effect on fertility behavior.

The primary task of this paper is to begin examining these relationships by reviewing and discussing the extant literature concerning rural development interventions and their impact upon education and hence fertility.

Rural development interventions are those constellations of events introduced into a rural environment by a national and/or international donor whose aim(s) in so intervening is to stimulate a sustained and generalized increase in the social and economic well-being of rural populations. That is, rural development activities should promote a more equitable distribution of and increase in income, education, employment opportunities, health and nutrition, and production and consumption of goods and services considered vital to the prosperity of rural populations (Kocher, 1973; Lele, 1975).

Lele (1975) suggests that there are three major features of rural development:

1. Improving the living standards of the subsistence population involves mobilization and allocation of resources so as to reach a desirable balance over time between the welfare and productive services available to the subsistence rural sector.
2. Mass participation requires that resources be allocated to low income regions and classes and that the productive and social services actually reach them.
3. Making the process self-sustaining requires the development of the appropriate skills and implementing capacity and the presence of institutions at the local, regional, and national levels to ensure the effective use of existing resources and to foster the mobilization of additional financial and human resources for continued development of the subsistence sector. Self-sustenance thus means involving, as distinct from simply reaching, the subsistence populations through development programs.

The United States Agency for International Development (USAID) characterizes rural development interventions as falling into one or more of the following six categories:

1. Participation of the rural poor
2. Extension of social services
3. Rural marketing systems
4. Area Development
5. Rural finance systems
6. Off-farm employment

There is nothing sacrosanct about these categories. They do, however, provide a fairly parsimonious way of perceiving rural development interventions and will accordingly be employed herein: Each category will be described further shortly.

What binds each of these rural development interventions together is their focus on economic and social development. The role education plays in actualizing these interventions is more or less explicit. Since education, especially formal education, when provided by the system is an extension of a social service, its role in this area is patent. The development of off-farm employment opportunities presupposes access to formal and/or non-formal education skills. Rural marketing systems, area development, and rural financial markets all infer the need to develop individual and group skills requisite for participation and/or administration and execution of such projects. Finally, effective participation of the rural poor, as much as any other type of intervention, requires the development of managerial and executive skills on the part of those who would participate in such programs.

A recent study (USAID 1978) of 128 projects underlines the importance of education in development interventions. Of 128 projects, 59, or 30% had education/training, as a primary emphasis. Training components, however, were in evidence in 117 of these projects. Thus the importance of education, both formal and non-formal, in the development process is well established.

The linkages between rural development interventions, education, and hence fertility are considerably more problematic to define. Even when education, seen as a form of extension of social services, is isolated, its direct impact upon fertility, especially in rural areas, is frustratingly equivocal (Cochrane 1977).

The role of non-formal education in LDCs is acknowledged as an important one for achieving rural development objectives, enhancing self-worth, and promoting avenues for economic improvement. However, there is a striking absence of literature which examines the linkages between non-formal education and fertility. Given that non-formal education is a component of many rural development projects or an outcome of these projects, it appears likely that non-formal education may impact upon fertility decisions in the following ways: First, to the extent that participation in non-formal education programs is highly valued and alters existing family patterns or the division of labor related to child care arrangements, it may lead to a greater awareness of the cost and value of children and thus consideration of fertility regulation decisions. Secondly, to the extent that non-formal education succeeds in meeting its development objectives, it may have a reinforcing effect on individuals to examine other modern ideas and values including those associated with family planning. Finally, rural development projects with non-formal education components which provide exposure to fertility related issues may predispose one to respond favorably to family size limitation decisions. The role of women in relation to non-formal education and fertility is central in each of these issues. While these issues are worthy of extensive examination, they are beyond the scope of the existing literature and thus will not be treated in the State-of-the-Arts paper.

Studies of human fertility have concentrated upon a number of important variables. Among those seen as salient, the following have been singled out for attention in these state-of-art papers:

1. The role of woman
2. Cost of children

3. Income and wealth
4. Land tenure
5. Rural-to-urban migration
6. Maternal child health, nutrition, and disease control
7. Education

As stated above, the aim of this state-of-art paper is to examine the extant literature concerning the impact of rural development intervention upon education and hence upon fertility. It will come as no surprise to the reader to learn that the relationship between rural development and education has^{not} been extensively examined as has the impact of education upon fertility. Establishment of a direct linkage, however, has largely been lacking.

One of the tasks to be undertaken herein will be to address this lacuna through the articulation of a framework which logically establishes linkages between rural development interventions, education, and fertility. The analytical framework of human fertility developed by Richard Easterlin (1969; 1973; 1976). will be employed. Easterlin's framework basically focuses on three sets of variables which affect fertility: demand for children, supply of children, and motivation and cost of fertility regulation.

What emerges from Easterlin's work is a three-equation model that provides the barebones framework for economic and sociological analyses of the impact of rural development interventions on fertility. It can be expanded and extended to serve as an adequate model for this study in its entirety; i.e. when key intervening variables of all the state-of-arts-papers are utilized to flesh out the functions affecting this relationship. An elaboration of this framework is presented in the Rural-Urban Migration and Fertility State-of-the-Arts paper.

It will be used herein to examine the role of rural development interventions

upon education and hence fertility. As such, it will seek to identify the demand, supply, and fertility regulation factors that empirical research has identified as the most salient intervening variables through which education effects on fertility can be measured. The next chapter will provide a working definition of each of the six rural development interventions sub-categories followed by a general hypothesis inventory relevant to each.

I. RURAL DEVELOPMENT INTERVENTIONS

This chapter will contain six major sections. Each will consist of: (1) a working definition of a particular rural development intervention; and (2) a general hypothesis inventory of germane supply, demand, and fertility regulation factors. Given the scarcity of data linking rural development interventions with education and hence fertility, the major portion of this chapter will be the explication of the extension of social services sub-category with special emphasis upon education and fertility. For the other intervention categories, in addition to citing extant literature, we will attempt to deduce relevant hypotheses from the larger body of education and fertility literature.

1.1 Participation of the Rural Poor

Participation generally refers to one or more activities engaged in by an individual with other individuals or with groups. The nature of the participation as well as the activities may be broadly characterized as social, economic or political. Each of these forms of participation and activity represent crucial aspects of the overall rural development process. Generating and sustaining the social and economic growth of rural communities requires the participation of the intended beneficiaries of this growth in the planning, design, implementation, and evaluation of programs designed to achieve this end (Cohen et al. 1978).

The impetus for the study of participation largely evolved from the recognition by professional practitioners in community development programs that the success of such programs depends to a great extent on maximizing the involvement of those for whom the programs are intended.

The vast majority of the people in the less developed countries live under what has been termed "substandard living conditions." Therefore, the participation of the rural poor in rural development programs and in the benefits which

accrue from these programs is a crucial factor in determining the success of rural development programs.

1.1.1 General Hypothesis Inventory: Supply factors

Participation of the rural poor generally implies non-formal training or formal education at primary level. Extant literature concentrates heavily upon level of formal education as a supply factor affecting fertility. If, for example, the problem of ever marrying is inversely related to level of education (Dixon, 1971), we would expect that participation projects would have little if any impact upon the decision of rural women with low levels of education and training on whether to marry, and no impact on men, at least in the short run.

Participation projects also tend to have training components of relatively short duration. Data which show that age at marriage, particularly for women, is directly related to lengths of education (Cochrane, 1977) will thus be inapplicable. Data do suggest, however, that labor force participation prior to marriage does effect age at marriage of women (Cochrane, 1977), but here too, the likelihood of participation is linked to level of education and thus caution must be exercised in hypothesizing that participating in project short-term training components results in lowered fertility.

Projects that link health-related supply factors to education and hence fertility will be treated in the section dealing with extension of social services.

1.1.2 Demand Factors

One of the salient demand factors is ideal family size. One could hypothesize that the degree of participation in a project varies inversely with

ideal family size. Unfortunately, there is no data to support such a position. Indeed, Aghajanian (1978) argues that increased economic participation when occurring in a farming milieu will result in a higher ideal family size and higher actual fertility. Further, he argues that when women are farmers, their fertility will not decline despite improved economic participation, a finding upheld by others (McGreevy, et al., 1974; Jones, 1977). Thus, the utility of children in rural milieus remains quite positive. Data linking participation and education to other demand factors (husband's or wife's wage; cost of children; child care cost; and incompatibility of wife's work) are largely lacking. Because some studies (Mueller, 1972; Mueller and Cohen, 1977) indicate that the affective utility of children is inversely proportional to education and parental income, one might hypothesize that as participation projects "pay off", i.e., as individuals become more secure economically, their perception of the utility of children will be altered.

1.1.3 Fertility regulation factors

Because these factors (knowledge, attitude, practice, husband-wife communication) are directly linked to extension of social services, they will be treated more fully in that section. At this point, it remains to characterize the literature as linking education directly to fertility regulations factors. Because most of these data show significant correlations in relationships with level of education, particularly western education, one's expectation regarding success of such programs when introduced as participation of the rural poor projects to be less than among more highly educated segments of a society.

1.2 Extension of Social Services

The extension of social services, like the participation of the rural

poor, is another rural development activity which is considered to be a vital factor in enhancing the overall well-being of rural populations in the less developed countries. There are many and varied types of social services presently being provided in these countries. These include literacy and manpower training, adult and vocational education, health and medical care, social security, and family planning programs. The extent to which these and other social services are actually reaching those for whom they are intended varies considerably within and among the less developed countries. Nevertheless, the extension of vital social services is a part of the modernization process which is proceeding at varying stages in the less developed countries. Modernization involves major alterations in the social, cultural, economic, and political organization of a society and is seen as having significant implications for reducing fertility levels through increased opportunities for individuals and families to become exposed to formal and informal education, and consequently, to a wider range of new ideas and behavior patterns which are consistent with a desire to limit family size (Goldscheider, 1971; Easterlin, 1974; Miller and Inkeles, 1974). Because of this paper's emphasis upon education and fertility, this section rather than examining at great length all aspects of social service extension, will instead concentrate largely upon education and incidentally upon other projects to the extent that education components, formal or non-formal, are relevant parts thereof.

1.2.1 Supply Factors

Holsinger and Kasarda (1976), as the result of a literature search, listed the following hypotheses affecting supply factors which they felt were empirically validated by the data:

- (1) formal schooling delays age at marriage and thereby reduces the total possible number of child bearing years of life.
- (2) schooling affects fertility by reducing infant and child mortality.

A third hypothesis which by extension is linked to supply criteria is that:

- (3) schooling enhances a girl's prospects for obtaining employment outside the home and potentially affects her probability of marrying.

This relationship between education and the likelihood of never being married is confirmed by Dixon (1971), Chojacka (1976), Maurer et al., (1973), and Speare et al., (1973). Holsinger and Kasarda's first hypothesis relating age at marriage and education (the higher the level of education, the later the date of marriage) is also generally upheld by the literature (Chander and Palan 1977; Chung, 1972; Dixon, 1971; Hawley and Prachuamoh, N.D.; Harmon, 1970; Kogut, 1974; Knowles and Anker, 1975; LaPierre-Adameyk, 1972; Mott, 1976; Nayar, 1974; Olusanya, 1971; Palmore and Ariffin, 1969; Stychos and Weller, 1967; World Fertility Survey (Nepal) 1977; and Yaukey, 1963. These data and other researchers, however, point out that female education is more significantly related to age at marriage than male level of education, and also show that marginal amounts of education (1 to 4 years) tend to be considerably less significant than advanced, particularly secondary education. A related consideration is also the impact of whether or not a woman is working or living in an urban rather than rural environment. In virtually all cases, urban working women give evidence of a more significant direct relationship between age at marriage and level of education.

Holsinger and Kasarda's second hypothesis regarding the relationship between education and infant mortality has strong intuitive support in the

literature. Indeed, Easterlin (1975) argues that the extension of social services results in decreased infant mortality and hence an improved supply of children. A perusal of the literature demonstrates general empirical support for this hypothesis, but with some important caveats. Shin (1975); Stockwell and Hutchinson (1975), for example, point out that certain environments, particularly those with poor and/or marginal health facilities in rural environments may obviate the opportunities of using health knowledge gained through higher education to improve chances of children surviving. Cochrane (1978) argues that the variables of improved income and living conditions must be added to the education-infant and child mortality equation in order to achieve a more significant empirical fit.

A fourth hypothesis linking health and education states:

- (4) there is a direct relationship between levels of education and attitude toward fertility issues such as lactation and postpartum abstinence.

Extant literature (Butz and DaVanzo, 1978; Cochrane, 1978) tends to support this hypothesis to the extent that the higher a woman's education the shorter the period of time she engages in breastfeeding. The data (Hull and Hull, 1977) also find that the higher a woman's level of education, the shorter the likely period of postpartum abstinence. The implication of these findings is that education alters cultural predispositions to space births, and hence tend to increase the supply of children.

1.2.2 Demand Factors

Holsinger and Kasarda argue that:

- (1) education increases aspirations for upward mobility and the accumulation of wealth, which reduces the desirability of children; and

- (2) education reduces the perceived economic utility of children, thus lowering the demand of parents for them.

Holsinger and Kasarda's first hypothesis is generally confirmed by the literature. Mueller (1972), Mueller and Cohn (1977), and Chang (1976) all established the link between education, wealth, and the desirability of a smaller family.

Cochrane's review of the literature regarding the second hypothesis demonstrates a more equivocal finding. Specifically, she finds that while level of education does indeed reduce the perceived economic utility of children, those with higher education nevertheless perceive a greater ability to afford larger families and therefore, at least in the short run, do not reduce the size of their families.

A third hypothesis developed by Holsinger and Kasarda states:

- (3) schooling enhances a girl's prospects for obtaining employment outside the home that competes with bearing and rearing children as a career.

Researchers have long recognized education as one of the primary ways of accumulating human capital and improving one's market productivity. Market productivity refers to the fact that educated people command both higher wages and anticipated potential income. Moreover, higher wages means that individuals value their time more highly in other activities (Becker, 1965), than child bearing and child rearing. In other words, the opportunity cost tends to be higher for each additional child for employable educated women (Mincer, 1963; Schulz, 1969b; Gregory et al., 1972).

Education has different effects for males and females. Where men share less in child rearing, male education represents more often a positive income effect (Maurer et al., 1973). For wives, education is expected to represent mainly a "price effect" and thus encourage them to enter the labor force or

other activities away from home at the expense of additional children (Schultz, 1972a; Harmon, 1970; Maurer et al., 1973).

Nevertheless, this negative relationship between female labor force participation and fertility reduction does not necessarily hold in the rural areas in developing countries (Stycos and Weller, 1967; Frejka, 1971; Stys, 1967; Weller, 1969). In fact, female labor force participation rate may be positively related to fertility in early stages of development when labor force activity is home based as in cottage industries where working is compatible with child bearing and where domestic help is readily and cheaply available. In such situations one also finds the presence of relatives to serve as parental surrogates while actual parents work. This situation makes the joint roles of mother and worker relatively easy to manage and accounts for the absence of a negative relationship between employment and fertility in the rural areas of LDCs. In other words, at lower levels of development, there is no role conflict between mother and worker. But as economic development reaches a certain stage, mothers maybe induced to work outside the home and a negative relationship may be established. Thus, the female labor force participation elasticity changes from positive to negative as the country moves from a relatively low level of development to a relatively high level of development. This can be explained by the fact that as development proceeds, the movement of employed women from the agricultural sector raises opportunity costs because mothers must withdraw from the industrial labor force to bear and rear children (Weller, 1969; Gregory and Campbell, 1976).

A fourth hypothesis concerning the demand for children and related to the perceived costs of children is that:

- (4) education shifts tastes to place emphasis on quality rather quantity of children which increases the cost of children and thereby reduces fertility.

The third hypothesis discussed above dealt with the impact of education on female labor force participation and in turn the indirect costs of children. This hypothesis deals more directly with the impact of parent education upon child education and hence the perceived cost of children and fertility. It seems logical that educated parents are more attuned to the importance of education for their children and are more likely to be willing to send their children to school for longer periods of time. Assuming that such parents are faced with finite resources, their desire to provide a full education for their children will require some limitation of the number of children they have. In other words, parents must achieve a rational allocation of their resources between the number of children (quantity) and the amount of resources they invest in each child (quality). This is the so called quantity/quality tradeoff (Becker, 1960; DeTray, 1973; Willis, 1973; Becker and Lewis, 1973).

Although the available empirical evidence is limited, there has been some support of the hypothesis that parents may substitute investment in children for number of children as development proceeds, thereby reducing fertility (Schultz, 1976b; DaVarizo, 1972). Data from rural areas in Africa and Latin America suggest that women who aspire to send their children to school are found to be more likely to opt for smaller families (Kennedy et al., 1974; Caldwell, 1976; Simmons, 1974; Micklin and Marnane, 1975). An additional hypothesis concerning demand for children states that:

- (5) the higher the level of education, the smaller the ideal family size.

The bulk of extant data supports this hypothesis, but with important caveats (Cochrane, 1978). Much of the data supporting this position is drawn from studies of urban areas. Where rural evidence exists, the expected inverse relationship is considerably less significant.

A final, related hypothesis is that:

- (6) the higher the level of education, the lower the incidence of son preference.

The pension motive or insurance value of sons has been considered as one of the primary benefits of having children. In societies where there is no form of old age insurance, adult sons are perceived as necessary to fulfill these needs. But, as development proceeds, parental incomes increase and the availability of institutional insurance plans may alter the need to have sons to provide a form of old age security protection (Repetto, 1976). Other literature (Cochrane, 1978) tends to support this finding.

1.2.3 Fertility Regulation Factors

Holsinger and Kasarda in their review of the education-fertility literature, elucidate the following hypotheses:

- (1) education provides directly or facilitates the acquisition of information on modern contraceptive devices and use.
- (2) education increases exposure to mass media and printed materials concerning family planning.
- (3) schooling affects communication between husbands and wives in ways that are conducive to lower fertility.
- (4) schooling imparts a sense of self efficacy, control over one's own fate, trust in science and technology, all of which promote the use of contraceptives as a rational means of controlling one's life and destiny.

To these may be added:

- (5) contraceptive use varies directly with level of education.

Existing literature provides strong support for the first hypothesis. Cochrane (1978), for example, points out that strong direct relationship between levels of education and knowledge of modern contraception is demonstrated in 28 or 29 studies. While many of these studies deal with urban areas, strong support for this relationship was discovered in rural areas as

well (Arnold et al., 1975; Caldwell and Igun, 1972; Chung, 1972; Khalifa, 1976; Knodel and Pitakespsombati, 1973; Palmore, 1959; Family Planning Survey (Nepal) 1975; Pool, 1970; Roberts, et al., 1965).

The relationship suggested in the second hypothesis, namely that education increased exposure to mass media concerning family planning proves to be a bit more problematic. In the abovestated literature, there is some evidence that indicates that media exposure itself may operate as a significant vehicle for expanding knowledge concerning contraception. Still, linkages between education and greater media involvement which in turn effect fertility do exist (Mueller, 1972b; Holsinger and Kasarda, 1976; Chow, 1968; Cernada and Lu, 1972).

One study conducted by Cernada and Lu (1972) in Kaoshiung, Taiwan found that less 1% of wives without formal education were reached by newspapers and magazines while 19% of the wives with formal education were reached by magazines and 29% by newspapers. The results of these studies indicate that women with formal education were reached by a broader variety of mass media than those without.

There are strong a priori reasons for assuming that level of education tends to improve communication between husband and wife. Couples with more education following from hypothesis two, will not only have greater access to communications concerning family planning and contraception from the mass media, but would be more likely to be able to intelligently discuss this information. Cochrane (1978), in her review of the literature, cites nine cases, all of which established a direct relationship between education and level of communication between husband and wife. An untested but important issue concerning husband and wife communication is that of whose education is more important in this communication process.

The fourth hypothesis stated above concerns the development of attitudes toward contraception. In 1954, Lorimer stated:

"this wish for offspring is not a innate component of human nature; it is not a basic drive. On the contrary, it is an acquired motive which is constantly being reinforced by social rewards and punishment. Promises of security, approval and prestige support and desire for children; threats of insecurity, punishment and ridicule block incipient wishes to escape the pain and cares of child birth and parenthood ..."

Culture, therefore, may dictate or affect the number of children a couple should have or would like to have. But education can change attitudes and enhance beliefs in one's ability to control events. It can provide women with a feeling of control over the conditions of lives and bodies (Jaffe, 1959). Hoisinger and Kasarda (1976) argue that attitudes have shown susceptibility to the influence of the classroom, and people's attitudes toward birth control are affected by formal classroom contact. Williamson (1970) finds evidence in Nigeria, Chile, East Pakistan, India and Israel for more favorable attitudes toward birth control where subjective efficacy is high. Cochrane's review of the literature bolters these findings. In 28 of 32 studies reviewed, she discovered a significant direct relationship between level of education and positive attitude toward birth control.

The fifth hypothesis which links education directly to fertility regulation, is largely confirmed by the data. Cochrane (1978) states:

Contraceptive use should be expected to increase with education for a number of reasons. First, the more educated appear to have greater natural fertility and generally higher rates of survival for their children. Second, ideal and desired family size tend to be inversely related to education. Third, the more educated have better attitudes toward and knowledge of contraception. Fourth, it is generally expected that more educated people are more rational in their behavior. That is, if they do not want more children, they will do something about preventing more births.

Of the 37 studies reviewed by Cochrane, 26 established a direct relationship between education and contraceptive use. Cochrane does point out that two important questions concerning this relationship remain largely unanswered. The first concerns the inability to determine from the literature just what level of education proves to be effective. The second concerns the inability to distinguish the extent to which contraceptive use arises from motivation per se or the ready availability of contraceptive devices. This second issue concerning the availability of family planning programs, deserves further discussion. Unlike other social services, family planning is a direct intervention governments can make to reduce their rates of population growth. Family planning programs are designed to foster the acceptance of small family norms through the provision of information and education to couples on the advantages of small family size and on appropriate techniques or contraception that may be used to limit family size. Depending upon the degree of success of family planning programs in spreading knowledge of birth control practices and influencing attitudes and behavior toward their use, these programs can be regarded as having a direct, causal, and immediate effect on fertility decline (Cornelius and Speidel, 1978).

There is some controversy among scholars and policy makers concerning whether or not family planning programs operate more effectively and efficiently to limit family size than social and economic development programs (Birdsall, 1977; Tsui and Bogue, 1978; Brackett et al., 1978). It is believed by some that increasing the social and economic well being of rural populations is the single most important force in bringing about fertility declines in the less developed countries. For example, Brackett et al., (1978) indicate that an assumption often made is that rural women who are poor and uneducated will not desire to

limit their fertility until they have experienced better education and employment opportunities outside the home, and particularly outside of agriculture. There is also the assumption that many less developed countries are still highly pronatalist and that family planning programs can not be expected to have a significant impact in reducing fertility rates, but the same can be said about modernization and development programs. That is, fertility has not responded to increasing modernization of many less developed countries because of powerful pronatalist religious institutions and cultural groups (Cutright et al., 1976; Tsui and Bogue, 1978).

The view which has perhaps received the greatest consensus is that modernization or development alone will not stimulate or accelerate fertility decline and that organized family planning, making modern means of birth control widely accessible, is also essential if progress is to be made in rapidly reducing fertility (Brackett et al., 1978; Cornelius and Speidel, 1978; Mauldin and Berelson, 1978; Tsui and Bogue, 1978).

Mauldin and Berelson (1978) argue that from a broad perspective fertility can be seen as a function of both demand and supply factors with the former affecting the level of motivation for fertility control and the latter affecting the availability of information and services for fertility control. According to these researchers, in terms of science, demand represents basic development determinants (i.e., socio-economic, cultural, socio-structural factors) that give rise to interest in limiting family size and supply represents one of the intermediate factors or mechanisms through which demand gets expressed in actual behavior. This argument tends to be consistent with the assertion that development can influence the fertility of a couple only through two broad mechanisms "(1) by changing the timing, frequency, duration, and nature of sexual union by

such means as delay and dissolution of marriage, separation of mates or abstinence; and (2) changing patterns of the availability and use of means of fertility regulation (i.e. contraception and abortion)" (Brackett et al., 1978:3)

Thus it may be concluded that in reducing the fertility rates of the less developed countries that there is not an either/or situation with regard to development or family planning as basic determinants, but both are important in bringing about fertility declines. Recent macro-studies of fertility decline in developing countries lend support to this conclusion (Mauldin and Berelson, 1978; Tsui and Bogue, 1978).

1.3 Rural Marketing Systems

Interventions stressing production and marketing products in rural areas undergird this subcategory. Like rural finance markets, the philosophy behind such programs is based upon the belief that increased and diversified productive capabilities of rural people are a key aspect of successful rural development. Older subsistence and barter modes of exchange must be replaced by marketing techniques consonant with a modern cash economy.

Some specific programs would include producers and marketing cooperatives, marketing depots, price stabilization policies, storage facilities development, improved farm management, processing facilities, and marketing communication and advisory services. Because of their location, marketing projects will be agricultural in nature, but the scope for including other related or non-related rural industries is vast. Handicrafts, agri-business development, tools manufacturing and brick and culvert manufacturing are just a few of the kinds of undertakings requiring marketing skills development.

As can be seen from the above examples, rural marketing systems often embrace projects which just as easily fall within one or more of the other rural development interventions subcategories. This patent overlapping serves to emphasize the interrelatedness of the rural development process.

At the present time, an examination of the rural marketing systems literature fails to disclose findings which link rural marketing systems with education and hence fertility. Consequently, the hypotheses listed below are meant to be tentative and suggestive. They are drawn from the extant literature dealing with education and fertility.

1.3.1 Hypothesis Inventory: Supply Factors

It is assumed that rural marketing systems project will continue to have education/training components and that these components will be of relatively short duration. Many of these projects will not be structurally complex. Others will require the presence of men and women with prior educational skills. One can speculate that the degree of success of such projects will in some measure be determined by the degree of commitment to those values that underpin a modern cash economy. Such beliefs or values are more likely to be established via the medium of formal or western education. This being the case, one can hypothesize that:

- (1) the greater the opportunities for educated women to participate in rural marketing systems projects, the more probable will be a delayed age at marriage of such participants.
- (2) the presence of opportunities for unmarried educated women to become involved in rural marketing systems projects will lead to a greater likelihood of their never marrying.
- (3) the greater the degree of commitment to the value set which underlies the development of rural marketing systems, the more likely will be the shortening of lactation of post-partum abstinence on the part of participating women.

The above hypotheses are seen to be more valid for those rural marketing systems projects which move participants, particularly women, off the farmstead (See Section 1.1: Participation). The first two hypotheses would have the likely effect of lowering the fertility of such participants. Most of the available literature indicates that delayed age of marriage of males does not significantly affect family size. There is little in the literature which examines the role of men who never marry.

The last two hypotheses, on the other hand, would lead to the likelihood of an increase in the supply of children.

1.3.2 Demand Factors

One of the most interesting processes at work in education curriculum development in the Third World is the enthusiasm for what has increasingly become known as more relevant education. In most countries with large rural populations this has come to mean the development of education which is more agriculturally relevant. One can conceive of how such an education would prepare children for more effective adult lives in rural environments. This would certainly include strengthening predispositions to make greater use of rural marketing systems projects. From the standpoint of fertility, such an academic orientation could easily result in an increase in the demand for children. One could for example, hypothesize that:

- (1) educational preparation of children to engage in rural activities that strengthen receptivity to rural marketing systems could well strengthen the idea of preference of a large ideal family size.
- (2) successful involvement in rural marketing systems projects could lead to a strengthening of the cultural predispositions to favor a large number of sons.
- (3) active involvement in rural marketing systems that emphasize family participation would strengthen the notion of perceived benefits of a large number of children.

- (4) education that prepares children to actively engage in rural life will lower the perceived cost of such children.
- (5) successful involvement in rural marketing systems projects will accordingly improve the economic position of parents and by virtue of this strengthen the perceived ability to afford children.

These hypotheses are all predicated upon the expectation that rural marketing systems projects will continue to be largely agricultural and farm-oriented in nature. The impact of programs or projects which place some distance between rural people and farms has been alluded to in the section dealing with education and fertility (Extension of Social Services). Ironically, rural parents today are often unenthusiastic about education programs which seek to prepare their children for continued rural existence. Such parents often see education as a vehicle for their children's upward mobility, but this mobility is not seen as occurring in rural areas but rather in urban white collar occupations. Thus, farm families are often resistant to education that stresses "agricultural relevance", for they view a return to farming on the part of their children as an admission of academic failure. Policymakers, therefore, may find themselves on the horns of a dilemma. Thus rural marketing systems projects and attendant relevant education which strengthens receptivity to such projects may well result in maintaining a high demand for children.

1.3.3 Fertility Regulation Factors

If the abovestated hypotheses are found to be empirically valid, one might anticipate an increase in the knowledge of birth control, and husband/wife communication concerning family matters. However, negative attitudes toward birth control and hostility toward contraceptive use may remain unchanged. Thus, the linkages between rural marketing systems, education, and fertility may well be those which give evidence of ongoing high fertility

rates in rural milieux.

One could conceive of conditions which would alter this process. The amount of arable land is, after all, not infinite. One can, accordingly, anticipate the arrival of a point in time when involvement in even the most successful marketing systems projects will alter the present orientation of demand factors. At such a point, one would anticipate that the same directions described in section 1.2 would hold true in rural areas well. At such a point in time, effective media development as well as improved opportunities for fertility regulation might well change the direction of these considerations as well. At such time, it may well be necessary to consider the relevance of education that, because of the emphasis on agriculture may be failing to prepare children for productive lives off farms. One effective way of confronting this issue before it becomes problematic is to conceive of rural marketing systems interventions as part of a larger overall area development, of topic to which we now turn.

1.4 Area Development

The concept of area development refers to areas with certain geographical, economic and social homogeneity, or areas which those homogeneous aspects combine to form a territorial pole of attraction (Prescatore, 1971). In addition, in such areas, the infrastructure required for integrated development are more easily created than elsewhere. Access to major communications routes are also readily available. Ideally, it should be an area which offers the best prospects for agricultural development but with a potential for change that would provide diverse modes of employment and income for the area as a whole. Thus, area development interventions would include infrastructural development, the development of education and health facilities, the development of supporting financial institutions, and a range of industrial projects, often of a processing nature, which can build upon and expand the area's productive capacity.

1.4.1 Hypotheses Inventory: Demand Factors

Like participation and rural marketing systems interventions, there is very little in the literature which links area development interventions with education and hence fertility. Some tentative hypotheses, however, may be inferred. One can assume, for example, that area development projects will include improved education opportunities, both formal and nonformal; It is also likely that as area development projects reach fruition, a wider range of employment opportunities will be available for men and women, many of them existing off the farm. This being the case, the same findings are held in section 1.2.1 would ultimately apply here. That is:

- (1) Unmarried educated women engaging in area development project activities, particularly those away from the home, would demonstrate a lower probability of ever marrying.
- (2) With the improvement of education opportunities for women one would anticipate that the age at marriage of women in the area development project site would increase over that of uneducated women and over the age at marriage of those women who lives at the area development site prior to its area development phase.
- (3) Because area development projects very often include extension of social services, one or more of these would likely be health related, resulting in improved health of parents and children.
- (4) Increased education for men and women in area development areas would result in cultural changes leading to shortened period of lactation and postpartum abstinence.
- (5) In keeping with the extension of health services, one would expect a decline in infant or child mortality within such areas.

The overall thrust of area development projects upon education and hence fertility, would therefore likely be mixed where the potential supply of births is concerned. To the extent that formal and nonformal education resulted in the preparation of significant number of young women to participate in non-traditional roles or roles that were more removed from the farmstead,

one would anticipate a negative impact upon fertility. However, the massive improvement in maternal and child health care, along with the introduction of non-traditional attitudes toward previous cultural orientations concerning length of lactation, and postpartum abstinence, would witness an increase in the overall supply of children. On balance, one would expect, at least in the short run, to find health, cultural and child mortality factors outweighing those inhibiting the supply of children, resulting in an overall increase in the supply of children in area development project locations.

1.4.2 Demand Factors

Over time, one would expect that successful area development projects would include education components which, if successful, would result in an alteration of previously held views concerning demand for children. One would anticipate that the direction of change would be roughly equivalent to that described in section 1.2.2, where the impact of education programs upon demand for children was treated. Although directly related to fertility regulations, one would anticipate that area development projects would be planned with some notion of an ideal family size for its participants in mind, and that this ideal size would be stressed as part of the education process. However, in the short run, it is expected that demand factors as a whole would continue to be determined by preproject considerations. Large ideal family size, preference for sons, a perception of the benefits of children outweighing their cost, and little attention to the affordability of children would combine to increase the supply of children.

1.4.3 Fertility Regulations Factors

To the extent that area development projects include health, education, and family planning components, one would expect to witness the same relation-

ship and impact of these factors as those described in section 1.2.3. Specifically, one would expect to witness an increase in the knowledge concerning birth control, positive attitudes toward birth control, increased use of contraceptives, and improved husband/wife communication regarding family planning. Given the rural location of such projects, the crucial factor here may well be the direct provision of family planning components and/or health education components within formal and nonformal education/training parts of the project. Where fertility regulations and health related education opportunities are not present, perhaps the most one can anticipate is a growing awareness of increased supply of children leading to an alteration of demand factors which, in turn, will lead families in area development projects to begin pressuring their respective governments to provide family planning opportunities.

1.5 Rural Financial Markets

Rural development interventions falling under this heading include a wide variety of programs dealing with agricultural credit and rural savings. Specific programs include small farmer credit programs, group borrowing schemes, interest rate programs, bank development, savings and loan cooperatives, savings clubs, and incentives for lending. Underlying all these programs is the belief that rural development, if it is to achieve its aims of improving living standards, effectively allocating resources, and becoming a self sustaining process, must include processes which lead to commercialization of the agricultural sector.

Historically, large farm owners have been the main beneficiaries of credit and savings programs and this continues to be the case. Small farmers, however, have recently become the focus of rural financial market programs.

At the present time, African farmers with small holdings have least access to rural financial market opportunities (about 5% of farmers get institutional credit). The figure for Latin America and Asia is only about 15% and these statistics obscure the skewed borrower patterns favoring large holders (World Bank, 1975).

As with most of the above cases, there is very little research in rural financial markets, i.e., literature which addresses itself to the relationship of rural financial markets and education and hence fertility (USAID, 1972; 1976; 1977).

1.5.1 Hypothesis inventory: Supply Factors

Rural financial markets projects, until recently, were largely directed toward male farmers. Kenneth Little (1973) studies the role of women who established informal financial markets in urban areas. In his study, Little discovered that the basic findings in section 1.2.1 above remain valid. That is, a mix with positive and negative factors leads to an overall increase in the supply of children. Increasingly, the need for rural financial markets projects affecting women as well as men is being recognized (AID, 1978). One would expect that empirical evidence linking rural financial markets to education and fertility would be very indirect. One might, however, hypothesize that where rural financial markets projects were such as to require complex financial training, and where women as well as men were involved in the administration as well as use of such projects (i.e., where rural financial markets projects were participatory and included extensive training of significant numbers of women), that the supply factor linking education and fertility as demonstrated in section 1.2.1 would hold in these instances as well.

However, because such projects tend to occur in remote areas, where the presence of health facilities are either poor or entirely lacking, it is probably more realistic to assume that such projects will have little if any impact upon the potential supply of births. This situation of course, could be dramatically altered where rural financial markets projects formed a part of a larger area development project.

1.5.2 Demand Factors

Because so much of the evidence (Easterlin, 1976; Cochrane, 1978) demonstrates that improved farming opportunities lead, at least in the short run, to larger families, one would expect that utilization of training necessary to engage in rural finance market opportunities that lead to improved economic status, would similarly result in short-term population increases among participating farmers. This may be true particularly in market economies where progressive farmers can expand the size of their holdings through purchase and therefore continue to prefer large ideal and real family sizes. Among larger landholders, even those with extended education, successful rural finance market participation may simply lead to the ability of such farmers to afford larger numbers of children on the farm, as well as enabling them to educate and/or provide any "surplus" children with economic means of support off farms. Among poorer farmers, and over time, even wealthier farmers, the mobilization of savings necessary to improve agricultural holdings and utilize rural finance markets, will likely force them to confront the issue of the opportunity costs of children. Thus, over time, increased training and sophistication resulting from the use of rural finance markets opportunities, should result in the same inverse relationship between education and demand factors as appeared in section 1.2.2. That is, the perception of both ideal and desired family size would tend to favor smaller family units, the desire for sons would likely decrease,

the perception of the benefits derived from children would similarly decline as the perceived costs of children increased. What would likely improve would be the perceived ability to afford children. In this process, the role of wife as financial agent would prove significant. One study (Tagumpay-Castillo, 1964) discovered both a correlation between the level of education and utilization of rural finance markets as well as the appearance of opportunity costs of children as a factor in the calculus of such women in determining their economic behavior.

1.5.3 Fertility Regulations Factors

There is little likelihood of discovering a relationship between rural finance markets projects, education, and fertility with respect to fertility regulation. As averred in section 1.5.1, the development of rural finance market opportunities will usually take place in those rural areas where the introduction of both fertility regulation and the availability of contraceptive devices will be small. However, where successful rural finance market projects lead to an alteration of demand characteristics, one would expect to find concomitant desires on the part of people to learn more ways in which they can regulate their fertility. Governments can certainly play a direct role in establishing such a linkage. Wang and Chen (1973), described such a project in Taiwan where couples who agreed to limit the number of children they had were given free bank deposits to be used solely for educating these children.

While the existence of rural financial markets is a critical issue, one can speculate that education can improve the awareness of its holders of the existence of rural finance market opportunities and concomitant means by which farmers and other rural dwellers can mobilize to acquire access to such markets. Such an education would likely include increased awareness of the

various dimensions of fertility regulation. While untested, this observation is one that should readily lend itself to empirical verification.

1.6 Off-Farm Employment

Off-farm employment in general includes projects aimed at rural cottage industries, assisting small entrepreneurs, agro-industries, and market town development. This may involve the organization of cooperatives, vocational training in non-agricultural skills, and/or adoption of appropriate technologies.

Further, off-farm employment projects sometimes refers to employment opportunities that are agriculture-related, such as jobs in rural development agencies, education and training programs, small farm credit units, agri-businesses, health, nutrition and food services, population and family planning agencies, and parastatals concerned with purchase and shipping of farm goods. They can be jobs related to production management, such as management of farms and ranches and large scale agri-business complexes (seed selection, livestock management, poultry management, and the like). Moreover, they can be jobs related to development engineering such as irrigation and water supply engineering projects. Also, off-farm employment projects may engender jobs in banking and credit union management and customer service relations. Finally, like rural finance markets projects, area development projects, participation, and extension of social services projects, off-farm employment interventions may appear as part of any or all rural development intervention projects.

1.6.1 Hypothesis Inventory: Supply Factors

Again, there is little data linking off-farm employment projects to education and hence fertility. The literature that does exist (Cochrane, 1978) demonstrates that the role of women in off-farm employment is more significant than that of men. Kasarda (1971), using data from censuses conducted in some

50 nations, finds that high rates of female labor force participation outside the home and low rates of economic activity of children depress a society's fertility level. One could, therefore, expect to find that educated women who leave home in search of employment off the farm will have a lower probability of marrying and a higher age at marriage. The state of arts papers dealing with the role of women, and rural to urban migration should be especially instructive in this area.

1.6.2 Demand Factors

Two important findings emerge from an examination of the impact of off-farm employment on supply criteria. One concerns ideal family size, the perceived benefits of children and the perceived costs of children. Children who work away from home initially send some of their earnings to their parents, but as time passes, the parent-child relationship becomes loose and the willingness of children to share their earnings will diminish as they marry and have their own families to support. As a result, the parents' attitude toward large family size tends to change (Goldstein, 1972).

The second set of findings impact upon all demand factors. This has to do with the importance of non-farm earnings to farm families. Studies (Oshima and Lai, 1971; Tsuchiya, 1972) have shown that as much as 40% or more of farm families' earnings may be derived from children working off-farms. In the short run, this would imply a preference for larger families, particularly sons, who would be able to provide the family with additional sources of income. Perceived benefits of children and the ability to afford children under such circumstances would outweigh the cost of children. But, as the links between such children as their families weaken (see above), and as the number of jobs off the farm reached a saturation point, one would expect an alteration in their calculus of the costs of and benefits derived from children.

Most of the above findings link off-farm employment directly to fertility. One might speculate that an increase in education results in an increase in income, particularly as education leads to involvement in off-farm employment. Easterlin's model speculates that as income increases, the demand for children tends to increase. However as income increases, it tends to raise aspirations for social advancement, which is tantamount to a increased desired for other goods that compete with children for limited family resources including time (Banks, 1954). This desire would act to reduce the number of children people would have. Thus, a rise in income effects fertility in both directions, and there is no way to predict the overall effect of an increase in income upon fertility (Simon, 1976). However, it has been stated that in the early stages development fertility tends to move directly with income (Simon, 1974; Encarnacion, 1972). More recent studies challenge this and suggest that at later stages of development when poverty is less severe there may be no significant relationship between income and fertility or even a weak negative one (Mueller and Cohn, 1977).

Thus, empirical results show no consistent effect of income upon fertility. Positive relationships have been found in studies of Weintraub (1962) Adelman (1963), Heer (1966), Schultz (1960), Gregory et al., (1973), while negative relationships have been found in the study of Friedlander and Silver (1967), Paydarfar and Sarram (1970), Krishnamurty (1966). Further, evidence that a curvilinear relationship--fertility rises and then falls as income rises in LDCs--has been found in the studies of Encarnacion (1972), Gregory and Campbell (1976).

The implications of these studies would imply that as development proceeds and off-farm employment opportunities increase, those educated and taking advantage of their education to obtain a job off the farm which results

in a rise in their income, will also have larger families. Over the long run, as development reaches a certain stage, a drop in fertility will occur. In any case, it would appear that employing women off the farm has a more significant impact upon fertility. In one empirical study, it was found that any increase in education of women would in two years bring about a 5% increase in female labor force participation and, concomitantly, a reduction of 0.03% of the birth rate (Harmon, 1970). It was also found that women who were employed outside their homes in non-agricultural occupations averaged about 1/2 child fewer than women engaged in home industries, or not participating in the labor force (Jaffe and Azumi, 1960).

In conclusion, we may say that in contrast to the generally well established negative relationship between female employment and fertility in the industrialized world, research focusing on LDCs detects no such uniform pattern (Stycos and Weller, 1967). Where the roles of mother and worker are entirely compatible we should expect little relationship between labor force participation and fertility decline. In LDCs, it is relatively easy to combine maternal and occupational chores on a family farm or in a cottage industry. Where the roles are relatively incompatible, there should be an inverse relationship between fertility and employment.

1.6.3 Fertility Regulation Factors

Because off-farm employment projects are more likely to include training and/or education requirements that alter traditional orientations, one would expect to find among those participating in such projects an orientation toward fertility regulation similar to that described in section 2.2.3. Davis and Blake (1956) argued that cultural changes lead to the alteration of social norms toward fertility regulation variables. Education is seen as a crucial

variable in fomenting this cultural change. Where women are concerned, the role that education plays in the relationship between off-farm employment participation and fertility is often seen as one of facilitating opportunities for such employment which, in turn, lowers fertility levels (Carleton, 1965; Standing, 1978). Even education in a non-formal sense may act as intervening factor between off-farm employment participation of women and fertility. That is, labor force participation, particularly in non-agricultural roles and the income derived from such participation, afford women the opportunity to become exposed to life styles predicated upon limited family size. Therefore, whether education is formal or non-formal, its effects can be seen both in preparing women and men for off-farm employment opportunities as well as impacting upon their knowledge of and attitude towards birth control. By extension, one can anticipate an improvement in husband-wife communication concerning fertility regulation. The actual practice of fertility regulation, as with other forms of rural development interventions, will depend largely upon the availability of fertility regulation services (Cochrane, 1978).

Summary

In this chapter, we have sought to identify existing relationships between rural development interventions, education, and fertility. The considerable body of education-fertility literature that does exist has formed the basis of our examination. Where empirical evidence establishing relationships between various types of rural development intervention, education, and fertility do not exist, a number of tentative hypotheses have been put forth. In most cases these have been draw inferentially from the extant education and fertility literature. These findings have been based largely on the general literature.

A summary of the direction of the effect of education on supply, demand, and fertility regulation factors can be seen in table 1.1. A more comprehensive summary and evaluation will appear in the last chapter. The following chapters will attempt to provide summarizations of these findings as they apply to specific geographical regions.

Table 1.1

THE DIRECTION OF THE EFFECT OF EDUCATION ON VARIABLES AFFECTING COMPLETED FERTILITY AND THE INDIRECT EFFECT OF EDUCATION ON FERTILITY THROUGH THE INTERVENING VARIABLES.

	Education's Effect on the Intervening Variables		Effect of Intervening Variables on Fertility	Education's Effect on Fertility through Intervening Variables	
	Male	Female		Male	Female
<u>Supply Factors</u>					
1. Probability of being married	+	-	+	+	-
2. Wife's age at marriage	?	+	-	?	-
3. Health	+	+	+	+	+
4. Separate location of spouse	-	?	-	+	?
5. Joint family, living	-	-	? (-)	?(+)	?
6. Legal, monogamous marital status	?	+	? (+)	?	?(-)
7. Taboos on sexual activity	-	-	-	+	+
8. Infant and child mortality	-	-	+	-	-
<u>Demand Factors</u>					
9. Preferences for children *	-	-	? (+)	-	-
10. Husband's wage	+	0	?	?	0
11. Money cost of children	+	+	-	-	-
12. Wife's wage	0	+	-	0	-
13. Incompatibility of wife's work	0	+	-	0	-
14. Child care cost **	0	+	-	0	-
15. Economic benefits of children	-	-	+	-	-
<u>Fertility Regulation</u>					
16. Husband's relative power	+	-	?(+)	?	?
17. Husband-wife communication	+	+	-	-	-
18. Knowledge of birth control	+	+	-	-	-
19. Attitude towards birth control*	+	+	-	-	-
20. Access to birth control	+	+	-	-	-

* Depends in part on the kind of education, religious or secular.

**Depends on societal level of female education.

SOURCE: Cochrane, Susan H, "Fertility and Education: What Do We Really Know?" Population and Human Resources Division, Development Economics Department, World Bank, July 1978, p. 72.

II. HYPOTHESIS INVENTORY: ASIA

The literature dealing with rural development and fertility has been approached herein by utilizing the model developed by Richard Easterlin. Because the bulk of empirical evidence is drawn from existing education/fertility literature, both this chapter and those other regionally specific chapters which follow will be organized according to supply, demand, and fertility regulation factors rather than by rural development intervention topics.

2.1 Supply Factors

Despite the wide variety of methodologies employed (e.g., correlation, multiple regression, estimated net effect, multiple classification and cross-tabular analyses), the literature tends to support those findings enumerated in section 2.2.1. With respect to the hypothesis that the higher the degree of education, the greater the likelihood of women possessing such education never being married, three major studies bear this out. Ruth Dixon (1971) in a general Asian survey, demonstrates a general correlation between higher literacy rates and the proportion of women never married. She does point out, however, that female employment establishes a stronger correlation than that of level of education. In Taiwan, Speare (1973), demonstrates that increases in education reduce the proportion of women ever marrying. These findings have been replicated in Thailand, by Maurer et al., (1973).

Of ten studies examining the relationship between education and age at marriage, nine supported the hypothesis that the greater the level of education for women, the greater the delay of marriage. The implication here is that delayed age at marriage will shorten the period of greatest fertility of such

women, and correspondingly reduce the supply of children. This is upheld by the data in Bangladesh (Chandburg, 1978) and Taiwan (Speare et al., 1973). Only those results found in Thailand (Hawley and Pracherabmoh, N.D.), prove to be irregular. Dixon (1971) and Smith (1977) finds support for the direct relationship between level of education and delays at age of marriage in their general Asian surveys. Findings in Malaysia (Chander and Palan, 1977; Palmore and Ariffin, 1969) Korea (Chung, 1972; LaPierre-Adamcyk and Burch, 1972), Pakistan (McGreevey and Holmes, 1975), India (Nayar, 1974), and Nepal (World Fertility Survey, 1977) all demonstrate a significant direct relationship between level of education and delayed age at marriage. This finding is also supported by Harmon (1970) in his study of the Philippines.

While the abovestated two hypotheses tend to have a negative impact on the potential supply of children, the remaining three, at least in the short run, tend to increase the supply of children. These are the hypotheses that argue that increased education leads to:

- (1) improved health of both parents and children;
- (2) cultural changes resulting in shortened lactation periods and postpartum abstinence; and
- (3) decreases in infant and child mortality.

These findings were generally upheld by the work of Jain (1969; 1970) in Taiwan, Chai and Cho (1976) in Korea, Butz and DaVanzo (1978), Heller (1976), and Chander and Palan (1974) in Malaysia, the World Fertility Survey (1977) in Nepal, Hull and Hull (1977) in Indonesia and Barlow (1967) in Sri Lanka. Singh (1974) found that an inverse relationship between education and infant and child mortality held in India if the mother was working. Only Sloan (1971) in Pakistan found a direct relationship between education and infant and child mortality. These equivocal results for Pakistan were also mirrored by the

findings of Khan and Sirageldin (1975). Cochrane et al., (1976) study in Nepal showed insignificant results.

Thus, while the data demonstrate some mixed results, the overall direction is clearly one of supporting the contention of Easterlin that in the short run, in less developed countries, supply factors will work to increase the potential supply of children.

2.2 Demand Factors

In Chapter II, we cited the study of Aghajanian (1978), which stated that a constellation of factors in rural environments served to maintain a fairly high demand for children. While there is general support in the Asian literature for the hypotheses expressed in section 1.2 (i.e., education varies inversely with perceived ideal family size, preference for sons, and perceived benefits of children, while varying directly with the perceived costs of children and ability to afford children), the findings are much stronger in urban areas than in rural ones. For example, studies examining education and ideal family size in Korea (Chung, 1972), Taiwan (Freedman et al., 1974; Speare, 1973), Thailand (Knodel and Pitakepsombati, 1973: World Fertility Survey, 1977), and Nepal (World Fertility Survey, 1977) all show an inverse relationship between level of education and ideal family size, while work in India (Pareek and Kothandapani, 1969), and West Malaysia (Palmore and Ariffin, 1967) indicates no significant inverse relationship when rural dwellers are surveyed. Even where inverse relationships were established, they were much more significant for urban than rural samples. Cochrane (1978) points out that in Thailand the urban differentials were twice those of their rural counterparts.

Relatively little data emerges concerning the costs of children. Reference to the state-of-arts paper dealing specifically with costs of children should

prove instructive in this regard. However, one study undertaken in the Philippines (Bulatao, 1975) indicates that the expected benefits from children were held to be high in rural areas, and therefore, larger ideal family sizes were seen as preferable. This tends to strengthen Aghajanian's findings. Mueller (1972), however, discovered that in Taiwan increased education and income did vary inversely with the perception of benefits's derived from children.

Where data was available, it supported the notion that the ability to afford children varied directly with level of education.

The implications of these admittedly spotty findings are that considerably more research concerning the role of demand factors and their relationship with education and fertility in Asia is needed. This is especially true for the rural areas.

2.3 Fertility Regulations Factors

The linkage between level of education and knowledge concerning contraception is one of the strongest relationships discovered in studies dealing with fertility regulation. This is certainly the case in Asia. This direct relationship holds both in those countries with family planning programs and in those without. Data do tend to show a stronger relationship in urban areas, but such a relationship remains significant and direct in rural areas as well.

The strong direct relationship between level of education and positive attitudes toward fertility regulation which prevails in the literature, proves to be more equivocal in Asia. For example, although Morrison (1961) and Pareek and Kothandupani (1969) demonstrate evidence of a strong direct relationship between level of education and favorable attitudes toward fertility regulation in rural India, Knodel and Pitakepsonbati (1973) in Thailand find

that small amounts of education may not produce as favorable an attitude as no schooling at all. However, where more than three years of education are provided in Thailand the relationship is direct. In West Malaysia, Palmore (1969) actually discovered an inverse relationship between level of education and attitude toward fertility regulation.

Studies of the actual use of contraceptive devices in Asia tend to largely confirm the direct relationship between level of education and actual contraceptive use. Studies in Korea (Chung et al., 1972), Bangladesh (Chandburg, 1978), Nepal (World Fertility Survey, 1977) Taiwan (Speare, et al., 1973), and Thailand (Knodel and Pitakepsonbati, 1973) all confirm this direct relationship. Only Palmore's study of West Malaysia (1969) demonstrates no difference between educated and uneducated people in rural areas with respect to contraceptive use. In this region, then, one can anticipate that rural development interventions which stress extensive education/training will ultimately result in greater knowledge of, favorable attitudes toward, and actual use of fertility regulation.

Finally, there is little in the way of information regarding the relationship between education and husband/wife communication. Two studies in (Mukherjee, 1975; and Ramakumar and Gopal, 1972) both show a direct relationship, although the Mukherjee study tended to demonstrate a stronger relationship between availability of media and fertility regulation communication than education. Clearly, this important area of fertility regulation is deserving of more extensive examination.

III. AFRICA

3.1 Supply Factors

There is considerably less education/fertility literature for Africa than is the case for other regions. For example, no major studies emerge which examine the relationship between level of education and the likelihood of ever marrying. Three important studies surface which examine the relationship between levels of education and age at marriage. One (Caldwell, 1968a), studies urban elites in Ghana and is therefore is not directly applicable. Two others (Mott, 1975; Olusanya, 1971) took place in Nigeria. There, a direct relationship was established between level of education and older age at marriage for women. A fourth study in Kenya (Knowles and Anker, 1975) found the same direct relationship for women.

An examination of health and altered orientations toward lactation and postpartum abstinence also reveals little. The only major study (Adegbola et al., 1977) occurred in urban Nigeria. There, a clear relationship between education and improved health of parent and child along with altered orientation toward lactation and postpartum abstinence was found.

The relationship between education and infant and child mortality elucidated in section 2.1 (i.e. the higher the degree of education the lower the likelihood of infant and child mortality) is verified by studies in Nigeria (Olusanya, 1971), and in Kenya (Knowles and Anker, 1975). A third urban study in Kenya (Kelley, 1976) also establishes such an inverse relationship.

The sparse data examining supply factors in Africa, then, does tend to support the general expectations regarding their role in the relationship between education and fertility. Considerably more research will have to be undertaken, however, in order to ascertain just how broadly applicable these findings are.

3.2 Demand Factors

Data examining the relationship between education and family size preference are available for Sierra Leone (Dow, 1971), and Nigeria (Ohadike, 1969; Olusanya, 1971; and Ware, 1975). All four studies tend to confirm the inverse relationship between level of education and family size preference, although Ohadike's study occurred in metropolitan Lagos and Dow's study included in capital of Freetown. Dow's study did include rural Sierra Leone as well, and his findings tended to confirm the expectations that differentials in ideal family size exist between urban and rural areas; the rural areas having larger ideal family sizes even when education is taken into account.

When turning to actual desired family size and its relationship to education, studies in Ghana (Pool, 1970) and Cameroon (Weeks-Vagliani, 1976) demonstrate the existence of an inverse relationship between level of education and desired family size. In the case of the Cameroon, this relationship was seen as significant.

The only available study examining costs and benefits of children in rural Africa was that of Olusanya (1971) in western Nigeria. There, he discovered an inverse relationship between the level of education and perceived benefits of children.

3.3 Fertility Regulation Factors

The paucity of data reflected above is also seen in an examination of the relationship between education and fertility regulation factors in Africa. However, a few studies have examined the relationship between education and knowledge of contraception and use of contraceptives.

Caldwell (1968b) found in a study of family size in tropical Africa

(Senegal, Ghana, Nigeria and Kenya) that the existence and length of formal education influenced attitudes toward family size, knowledge of contraception, and use of contraceptives. Further, Caldwell found that in areas of predominantly traditional culture and agricultural practices, the various indicators of potential fertility control were at their lowest intensity.

Also, studies in Nigeria (Caldwell and Igun, 1972; Arowolo, 1976) and in Ghana (Poole, 1970) point to evidence of a direct relationship between education and knowledge of contraception and contraceptive practices.

Three studies, one in Sierre Leone (Dow, 1971), one in Nigeria (Morgan, 1975) and one in Ghana (Poole, 1970), each demonstrate a direct relationship between level of education and positive attitudes toward fertility regulation.

With respect to the relationship between education and the actual practice of family planning, there are no major studies in Africa to examine. However, in the case of the relationship between education and husband/wife communication concerning contraception, one study in Nigeria (Olusanya, 1971) and two in Ghana (Oppong, 1970; and Poole, 1970) all show a direct relationship, particularly when degree of education of the wife is taken into account.

The paucity of data in Africa is reflected in both the small number of cases cited above and the repetition of those case studies when examining supply, demand, and fertility regulation factors. This being the case, the case study section below will accordingly concentrate upon issues rather than specific countries.

IV. LATIN AMERICA

4.1 Supply Factors

An examination of evidence for Latin America dealing with the relationship between education and the proportion of ever married individuals discloses a single study, that of Chile (DaVanzo, 1972). This study confounds the expectation that increased education for women will decrease the likelihood of their ever marrying. Cochrane (1978) explains this by suggesting the possibility that Chilean women are following a pattern consistent with western and developed countries than those of an LDC. DaVanzo does find, however, that where men are concerned, the expected inverse relationship prevails.

Turning to the issue of whether education delays the age at which marriage occurs, we find that most of the studies covering Latin America have occurred in urban rather than rural areas. The general conclusion drawn from these studies is that they support the contention that increased education delays age at marriage, but as in the case of the Asian data, there are indications that short amounts of education may have little or no effect upon age at marriage (Stycos, Peru, 1968; Yaukey and Thorsen, San Jose, 1972; CELADE, Caracas, Mexico City, Bogota, and Rio de Janeiro, 1972; Kogut, Brazil, 1974).

There is virtually no data for Latin America which examines the relationship between education and health and alteration of cultural patterns. The effect of these, however, can be implied from an examination of the relationship between education and infant and child mortality. What does in fact emerge from such an examination is a rather mixed picture. Sloan's (1971) studies of Puerto Rico, for example, show that a very low level of infant mortality

does not co-exist with a high literacy rate. In this case, the provision of extensive public health services by the mainland US seems to be more significant. Sloan's examination of Costa Rica and Mexico, reveals similarly mixed results. Specifically, infant mortality did not correlate as significantly with education as did pre-school mortality. Stycos's study of Peru (1968) tended to confirm the expected inverse relationship between level of education and infant and child mortality. As stated earlier in this study, a firmer fix on the relationship may be confounded by the absence of health facilities in rural areas. But there is little doubt that education does play a role in this process.

4.2 Demand Factors

Examination of demand factors relating education and fertility for Latin America proves problematic, because virtually all available data stems from urban studies. The CELADE study of nine Latin America cities (1972) for example does show an inverse relationship between level of education and ideal family size preference in seven of its nine cities. Furthermore, all nine cities demonstrate an inverse relationship regarding level of education and ideal number of sons. How relevant this is to the rural areas of Latin America is, unfortunately, unknown.

With respect to examining the perceived costs and benefits of children as well as the ability to afford them, we are similarly without the benefit of rural data. Utilizing the CELADE study cited above, one can speculate that these results imply decreasing perceived benefits of children, increasing perceived costs of children, and probably an increased perceived ability to afford children. Empirical verification of these observations, however, remain to be determined.

4.3 Fertility Regulation Factors

An examination of fertility regulation factors as they apply to education and fertility in rural Latin America provides one with more direct data. In examining the relationship between education and knowledge of contraception, for example, Simmons, and deJong (N.D.) analyze this issue in Costa Rica, Colombia, Mexico, Peru. In each case they found a strong relationship between education level and knowledge of contraception. This direct relationship was strongly reinforced, according to the author by including in the equation, the general level of education of the community knowledge where family planning education and family planning facilities existed.

Turning to the relationship between education and attitudes toward contraception and fertility regulation, one again is confronted with the absence of rural based data from which to draw conclusions. The extant significant data is drawn from the urban-based CELADE study. There, one finds strong evidence of a direct relationship between level of education and positive attitude toward fertility regulation. One should, however, exercise caution in assuming that the same relationship holds in rural areas.

Caution must also be exercised when examining the relationship between education and contraceptive use. The only two major studies examining this relationship are, like others, urban based. In both (CELADE, 1972; Sear, 1975), significant direct relationships were established between level of education and the practice of birth control. In an independent study in Mexico City, Freedman and Coombs (1974) found the same significant relationship. These findings, then, are in keeping with those discussed in the general literature. What is needed is empirical validation based upon rural case studies.

V. THE MIDDLE EAST

5.1 Supply Factors

The Middle East, as with other regions, is not an area rich in documentation concerning the relationship between education and supply factors. For example, only Ruth Dixon's (1971) macro-study provides information on the relation between level of education and likelihood of never marrying. The Dixon study confirms the pattern which she describes as an Eastern pattern; i.e., the higher the level of female education, the more likely it will be that recipients will not marry. Turning to the relationship between level of education and the age at which women marry, the results proved mixed and more urban based than rural. Dixon finds a significant direct relationship between age at marriage and education. Amani (1971) supports this finding but this study is urban based. Stycos and Weller (1967), working in Turkey, discovered this same direct relationship in both urban and rural settings. But Yaukey (1963), working in Lebanon found that although Moslem women conformed to Dixon's eastern pattern, no relationship between education and delayed age at marriage was discovered for Christian women, and Paydarfar (1975) undertaking research in Iran discovered no such correlation between education and age at marriage among rural and tribal populations.

Are middle eastern women more fecund? The only available literature, the work done by Yaukey in Lebanon, discloses that the answer to this question for urban women was yes. We were, unfortunately, unable to find empirical validation of this finding for the rural areas of the region. Similarly, Yaukey's study is the only one examining alteration of cultural predispositions regarding period of lactation and postpartum abstinence. In his Lebanese

urban sample, Yaukey found that women with more education were in fact shortening their breast feeding and abstinence periods. In Turkey, Karadaui et al., (1974) determined that illiterate women had three times as many children as those with university educations. This inverse relationship was also found in Israel (Ben Porath, 1974)

In addition to those studies stated above, an examination of the relationship between level of education of parents and lower infant and child mortality, Khalifa (1976), discovered in the rural areas of Egypt that an inverse relationship did exist. This fragmentary evidence, then, seems to support the contention of Easterlin, Aghajanian, and others that in LDCs, the impact of education on supply factors will--at least in the short run--lead to an increase in the supply of children.

5.2 Demand Factors

The findings regarding the relationship between educational level and demand factors are, in the Middle East, mixed. For example, Khalifa, in a study in Cairo, discovered that for men and women over 45, an inverse relationship between level of education and ideal family size existed. For women under 45, however, a curvilinear relationship was reported. Yaukey, in his Lebanese study discovered that an inverse relationship existed, but that such a relationship was not very significant. Paydarfar's findings on Iran, reported above, are mirrored when turning to demand factors. That is, no significant relationship between level of education and desired family size emerges when rural and tribal samples are studied. Rizk (1977) in her study of Jordan, found that the inverse relationship between level of education and desired family size held through secondary education. Further data which examines the relationship between education and the demand for children, particularly that analyzing costs and benefits of children and ability to afford

children are unfortunately, lacking.

5.3 Fertility Regulation Factors

Data examining the effect of education on fertility regulation in the Middle East is drawn largely from the studies of Kahalifa, Yaukey, and Freedman and Coombs (1974). Kahalifa's examination of rural Egypt found a direct relationship between level of education and knowledge of contraceptive practices. This same study determined that there was direct relationship between level of education and positive attitude toward fertility regulation.

With respect to the relationship between level of education and actual use of contraceptive methods, Khalifa and Yaukey, who examined Cairo, and Beirut respectively, found that, for urban women there was a direct relationship between level of education and actual use of contraceptives. In the case of Cairo, Khalifa determined that among men, those with medium levels of education showed greatest propensity to use contraceptive methods. These findings were supported by Freedman and Coombs' study of Ankara. There, in each of three age cohorts, women with senior high school or greater education were more than twice as likely to utilize contraceptive devices. A similar relationship was reported in Israel by Ben-Porath (1973).

Khalifa found that a direct relationship between level of education and husband-wife communication regarding contraception and fertility regulation held in rural areas as well. Thus, these admittedly few studies, tend to support the general findings elucidated in Chapter II.

VI. CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This research has attempted to distill a theoretical framework from the current literature for analyzing the impact of rural development on education and hence human fertility behavior in the Third World. As the analysis has shown, any rural development strategy will have positive as well as negative effects on fertility. The net impact of rural development on fertility through education depends in part on stage of development and in part on the transformation of group norms, familial institutions and personal attitudes which will evolve slowly along with economic development and cultural change. A summary of these findings appears in table 6.1.

This analysis suggest the following conclusions:

- (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:

Table 6.1

EVIDENCE SUPPORTING THE RELATIONSHIP BETWEEN EDUCATION
AND FERTILITY THROUGH THE INTERVENING VARIABLES

Relationship of Education and Variable	Variable	Results		Probable Relationship of Education Through the Variable
		Supporting	Not Supporting	
?	1. Potential Supply of Births	-	-	?
Inverse	a. Probability of marrying	6	5*	-
Direct	b. Age of marriage	59	12*	-
Direct	c. Health	2	0	+
Inverse	d. Lactation	6	0	+
Inverse	e. Postpartum Abstinence	2	0	+
Inverse	2. Infant or Child Mortality	16	7	-
Inverse	3. Demand for Children (Desired Family Size)	17	7	-
Inverse	a. Preference for children Ideal Family Size	20	7*	-
Inverse	Desired Number of Sons	8	1	-
Inverse	Perceived Benefits of Children	17	2	-
Direct	Perceived Costs of Children	2	0	-
Direct	Perceived Ability to Afford Children	9	3	+
Direct	4. Fertility Regulation (Contraceptive Use)	26	11	-
Direct	a. Attitudes toward birth control	28	4	-
Direct	b. Knowledge of birth control	28	1	-
Direct	c. Husband-Wife Communication	9	0	-

* Relationship of male education to the variable is much weaker than that of female.

Source: Cochrane, S.H., "Fertility and Education: What Do We Really Know?" World Band, 1978, P. 158.

- (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 higher the perceived costs of children.
 - (4) The higher the level of education the greater the perceived ability to afford them.
- (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, and
 - (4) The higher the level of education the more likely will there be husband-wife communication concerning family planning practice.

6.2 Considerations for Future Research

This review of the literature concerning rural development interventions and their impact on education and hence fertility in the developing regions of Africa, Asia, Latin America and the Middle East clearly suggests a need for more empirical research before the nature and strength of the relationships between these variables can be adequately specified. Our knowledge in this area might be advanced by research which considers the following:

- (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 employing 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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This desire was found to be strong among rural, poor, and not very well educated women in all countries. The authors conclude that socio-economic development is not a dominant factor in terms of the desire for fertility control by the populations, except among the poorest where the sheer survival of the existing family dictates the need to control further fertility. The role of family planning in at least eight of the ten countries is considered to be a prime factor accounting for fertility control and ultimately the declining rate of fertility in these countries.

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Davis, Kinsley

- 1963 "The Theory of Change and Response in Modern Demography History." Population Index 29: 345-369.

This work develops theories and enlists empirical evidence of change and response to explain sociological aspects of human fertility behavior in modern history.

David, Kinsley and Judith Blake

- 1956 "Social Structure and Fertility: An Analytical Framework." Economic Development and Cultural Change 4: 211-235.

This landmark work classifies the "intermediate variables" that immediately effect fertility and discusses their level and relation to selected social factors in pre-industrial society.

Detray, Dennis N.

- 1973 "Child Quality and the Demand for Children: Journal of Political Economy 81 (2): 70-95.

The paper considers the degree to which pure economic theory can, or cannot, predict changes in completed fertility. The major emphasis of this study is the way which households can increase their production of child services either by increasing numbers of children or by increasing the resource investment in existing children. Quantity and quality are considered to be substituted in the households production function for child services.

Dixon, Ruth B.

- 1976 "The Roles of Rural Women: Female Seclusion, Economic Production, and Reproductive Choice," Pp. 290-322 in R. A. Ridker (ed.), Population and Development, the Search for Selective Interventions, Baltimore: The John Hopkins University Press.

The central argument of this paper is that the practice of female seclusion, by depriving girls and women of direct access to material and social resources in the community at large, creates in them a condition of extreme economic and social dependence that not only compels their early marriage but also militates against the effective practice of birth control within the marital union. As social and economic opportunities for girls and women in the community begin to undermine old bases of authority within the family and as traditional patterns of early marriage and frequent childbearing becomes less and less to justify, a more desirable form of demographic behavior may emerge.

Drakotos, Constantine G.

- 1969 "The Determinants of Birth Rate in Developing Countries: An Econometric Study of Greece." *Economic Development and Cultural Change* 17: 596-603.

The paper investigates whether economic development has any dampening effect on population growth with special reference to the deterrent of the birth rate in a developing country like Greece. The study reveals that per capita income is not so useful in explaining the variance in the birth rate. The literacy rate is found to exert the strongest influence on the birth rate, followed by the rate of reproductive women to total population.

Easterlin, R. A.

- 1969 "Towards a Socio-Economic Theory of Fertility: A Survey of Recent Research on Economic Factors in American Fertility." pp. 127-156 in S. J. Behrman, L. Corsa, Jr., and R. Freedman (eds), *Fertility and Family Planning: A World View*. Ann Arbor: University of Michigan.
- 1973 "The Economics and Sociology of Fertility: A Synthesis." University of Pennsylvania, Department of Economics.

A solid theoretical framework is developed beyond the author's 1969 work to enable economists and sociologists each to see the relevance of the other discipline's work. This framework includes three equations: equation of the demand for children, equation of the supply of children and equation of the motivation for controlling baby-making.

Easterlin, Richard A.

- 1974 "The Effect of Modernization on Family Reproductive Behavior." pp. 263-288 in the United Nations (ed.), *The Population Debate: Dimensions and Perspectives*, Papers of the World Population Conference, Bucharest.

This paper provides a theoretical examination of the nature and causes of the change in family reproductive behavior associated with modernization. The paper consists of four sections. The first section discusses the meaning of modernization and describes the changes in family behavior associated with it. The second presents a theoretical framework for analyzing the determinants of fertility behavior. In the third and fourth sections, the causal links between modernization and fertility

behavior are traced. The aspects of modernization which the author considers as determinants of reproductive behavior are: better health and medical care, growth in formal education, and mass media, urbanization, new goods (consumer and fertility control goods), and per capital income growth. These determinants are suggested to affect fertility through one or more of the following: "(a) the demand for children, the number of surviving children parents would want if fertility regulation were costless; (b) the potential output of children, the number of surviving children parents would have if they did not deliberately limit fertility; and (c) the costs of fertility regulation, including both subjective (psychic) costs and objective costs, the time and money required to learn about and use specific techniques.

Ekanem, Ita I.

1972 "The Further Note on the Relation Between Economic Development and Fertility." *Demography* 9: 383-388.

In the paper, the author reruns the Heer's 1966 model for LDCs and finds the pattern of relationship in each group of country changes significantly. The study seems to support two of the hypotheses in the Heer's study. For LDCs, it remains true that increased economic development implies a decreased illiteracy and infant mortality rate and in turn lower fertility rate. Nevertheless, the data do not seem to resolve the question of whether increased economic development implies a decreased fertility rate.

Farcooq, G. H. and Baran Turcer

1974 "Fertility and Economic and Social Development in Turkey: A Cross-sectional and Time-series Study." *Population Studies* 28: 263-276.

The work explores the impact of modernization which started in the early 1920s on the fertility levels in Turkey. The major finding of the study is that continuing modernization and the concomitant speed of female education would result in a continuing decline in the fertility rate.

Faundes-Latham, Anibal, German Rodriguez-Galant, and Onofre Avendano-Portius

1968 "Effect of a Family Planning Program on Fertility of a Marginal Working-Class Community in Santiago." *Demography* 5:122-137.

This paper describes the results of a research project designed to ascertain the possible effect of a family planning program on fertility, abortion, infant mortality, and several social and psychological variables in a working-class community in Santiago.

Freedman, Deborah S.

1972 "The Relationship of Family Planning to Savings and Consumption in Taiwan." *Demography* 9: 499-505.

This study relates fertility behavior to modern economic behaviors, namely, savings and consumption of modern durables in Taiwan. It is found that successful family planners are more likely to save and to have more modern durables.

Freedman, Deborah S.

- 1976 "Mass Media and Modern Consumer Goods: Their Suitability for Policy Interventions to Decrease Fertility." Pp. 356-386 in Ronald G. Ridker (ed.), Population and Development: The Search for Selective Interventions. Baltimore: John Hopkins University Press.

The author explores the possibility that programmatic changes in exposure to mass media and consumption of modern goods and services can have an impact on fertility decline in less developed countries. The nature and strength of these assumed relationships are reviewed and consideration is given to policy implications for governments in less developed countries.

Friedlander, Stanley and Morris Silver

- 1967 "A Quantitative Study of the Determinants of Fertility Behavior." Demography 4: 3-70.

This study empirically examines a wide range of hypotheses relating social, economic, and political variables to fertility based on data from countries classified as developed, intermediate and underdeveloped. The empirical analysis of these hypotheses reveal positive and significant relations between fertility and illiteracy, child mortality, proportion of agricultural population, proportion of non-farm self-employment, and overcrowded housing. A negative significant relation is revealed between fertility and communism. Statistically significant relations were not established for population density, social mobility, substitutes for sexual intercourse, achievement motivation, protein in the diet, and religion.

Frejka, Thomas

- 1969 "Demographic Aspects of Women's Employment." pp. 1959-1982 in International Population Conference. Liege: International Union for the Scientific Study of Population.

This work examines the relationship between female employment and fertility. The results indicate that the most important factor determining whether or not a woman is working is the number and age of her dependent children. On the other hand, the length and type of employment influences the amount of children women desire.

Glassman, Marc B. and John A. Ross

- 1978 "Two Determinants of Fertility Decline: A Test of Competing Models." Studies in Family Planning 9:193-197.

An examination of the modernization and fertility hypothesis based upon several statistical models and data from eighty-eight countries. Among the statistical models used to evaluate the hypothesis were a simple linear-additive model and a threshold model involving quadratic terms for the variables (infant mortality rate and education) indicative of modernization.

Goldscheider, Calvin

1971 "Population, Modernization and Social Structure," Boston: Little Brown and Company.

This book provides a sociological analysis of demographic processes and a discussion of theoretical, methodological, and empirical issues and problems associated with sociological demography. The central focus of the analysis is areas of convergence in sociological and demographic inquiries. Two major themes emphasized are the role of population processes in the modernization of societies and the relationship between social differentiation and population processes. The author relies upon historical and comparative evidence on social and population processes to identify the linkages between major aspects of societal transformations indicative of modernization and changes in fertility, mortality, and migration.

Goldstein, Sidney

1972 "The Influence of Labor Force Participation and Education on Fertility in Thailand." Population Studies 26: 419-436.

This paper undertakes a comparative analysis of the relation among female labor force participation for the urban and rural segments of the Thai population. The major finding of this study is that the greater separation of work and family roles, which characterizes employment for women in the urban center, lower fertility. In the general absence of such a conflict in rural society, female labor force participation has minimal effect on fertility. And, regardless, of residence category, education is inversely related to fertility level.

Gregory, Paul R., and J. M. Campbell, Jr.

1976 "Fertility Interactions and Modernization Turning Points." Journal of Political Economy 84: 835-847.

This paper provides an estimate interaction model of fertility and economic development which directly incorporates into the fertility decisions such factors as taste changes and variations in the fertility control associated with modernization. The results show that fertility income and substitution effects do vary considerably during the course of modernization.

Gregory, Paul R., J. M. Campbell and Benjamin S. Cheng

1972 "A Cost-Inclusive Simultaneous Equation Model of Birth Rates." Econometrica 40: 681-687.

In this paper, the authors develop a simultaneous equation model of birth rates composed of four estimated equations. This work differs from past research in that it considers the simultaneous relationship between birth rates and income and includes the cost of fertility as an explanatory factor. This cost is measured by the female labor force participation rate under the assumption that income foregone due to fertility is a significant opportunity cost.

- 1973 "Differences in Fertility Determinants: Developed and Developing Countries." *Journal of Development Studies* 9: 233-241.

The study estimates two separate fertility models for developed and developing countries to determine if they are the same. The author conclude that insofar as education is a significant determinant of natural birth rate in developing countries, investment should be allocated to social infrastructural uses which raise the level of education and thereby reduce fertility rather than to physical capital consumption. The empirical results indicate that birth rates can be reduced in developed countries by a combination of infrastructural investment in human beings and by encouraging greater female participation in the labor force.

Harbison, F., and C. A. Mayers

- 1964 *Education, Manpower and Economic Growth, Strategies of Human Resource Development*. New York: McGraw-Hill Book Co.

This volume analyzes economic, political, and social development in the context of education, training, and energizing of human resource. It presents a generalized concept of human resources development which is important to economic planners and educational manpower planners.

Harman, Alvin J.

- 1970 "Fertility, Manpower and Economic Behavior of Families in Philippines." Santa Monica: The Rand Corporation.

This is an empirical analysis of the interrelationships between fertility and socioeconomic behavior of families. The analysis is designed to give insights into the relative merits of various policies affecting population growth. Results show that education and income for all age groups and increased female education correlate with smaller family size, higher age at first marriage, and employment.

Hassan, S.

- 1966 "The Influence of Child Mortality on Fertility." Paper Presented at Annual Meeting of the Population Association of America, New York City.

This is a refined analysis of the influence of child mortality on fertility in the Middle East.

r, D. M., and E. S. Turner

- 1965 "Area Differences in Latin American Fertility." *Population Studies* 18:279-292.

This study correlates areal differences in the child women ratio in the 318 local political units of 18 Latin American countries. The results disclose that the level of economic development is positively related to fertility in the short run which is counteracted in the long run by fertility-depressing forces associated with a high level of economic development.

Heer, David M.

- 1970 "Economic Development and Fertility." pp. 275-293 in Thomas R. Ford and Gordon F. DeJong (eds.), *Social Demography*, Englewood Cliffs, N.J.: Prentice Hall, Inc.

The author reviews two contrasting theories on the relationship between economic development and fertility and discusses empirical studies which lend support to each. One theory contends that economic development has an inhibiting effect on fertility while the other suggests that economic development promotes fertility. To reconcile these contrasting views, the author develops and test a theory which suggests that "the direct effect of an increase in the level of economic well-being in a society is an increase in fertility, but various indirects of an increase in economic well-being have such adverse consequences for fertility that, taking into account both direct and indirect effects, an increase in economic both direct and indirect effects, and increase in economic level decreases fertility."

Henin, R.

- 1968 "Fertility Differentials in the Sudan." *Population Studies* 22: 147-164.

This paper reports on a demographic survey of 4750 women, aged 15 and over, that was carried out in 1961-62 in different parts of the Sudan to study fertility differentials between the nomadic and settled population. It is found that the settled populations tends to have higher fertility than that of nomadic.

- 1969 "The Patterns and Causes of Fertility Differentials in the Sudan." *Population Studies* 23: 171-198.

This is an extension of the author's 1968 study. The paper examines the nature of the fertility differentials in the Sudan and assesses possible causes such as different marriage patterns and medical and psychological factors.

Hohm, Charles F.

- 1976 "An International Analysis of the Effects of Family Allowance Programs on Fertility Levels." *International Journal of Sociology of the Family* 6:45-56.

Using secondary data on sixty seven countries, this study examine the effects of family allowance programs on fertility levels controlling for the effects of other variables indicative of economic development. The control variables were: (1) infant mortality rate per 1,000 population, (2) newspaper circulation per 1,000 adult population, and (3) per capita gross domestic product of the economically active population. Two aspects of family allowance programs were considered in the analysis, coverage and benefit level of the programs. The former refers to how well a program covers the children in a given country while the latter refers to the relative size of family allowance payments.

- Holsinger, Donald B. and John D. Kasarda
1976 "Education and Human Fertility: Sociological Perspectives."
Pp. 154-181 in Ronald G. Ridker (ed.), Population and Development: The Search for Selective Interventions, Baltimore: The John Hopkins University Press.

The authors examine the differential ways in which increases in formal education may have an impact on fertility decline. Based upon extensive literature reviews, the indirect, direct, and joint effects of education on fertility are discussed. Path analysis is recommended as a tool to determine the relative importance of each type of education effect on fertility.

- Huffman, S. L. A. K. M. Alauddin, C. J. Charkraaborty and W. H. Mosley
1978 "Nutrition and Post Partum Amenorrhoea in Rural Bangladesh."
Population Studies 32: 262-273.

A cross-sectional survey of 2048 breastfeeding women in rural Bangladesh was conducted in 1975 to explore factors affecting the duration of post-partum amenorrhoea. The study suggests that the pattern of breastfeeding plays the primary role in determining lengths of lactational amenorrhoea for the rural population.

- International Bank for Reconstruction and Development
1975 Rural Development: Sector Policy Paper. Washington, D. C.

This work examines policy issues related to rural development.

- 1978 World Development.

This is a series of annual reports compiled by the World Bank to provide a comprehensive assessment of the global development issues along with a statistical annex.

- Jaffe, A., and Ke. Azumi
1960 "The Birth Rate and Cottage Industries in Underdeveloped Countries."
Economic Development and Cultural Change 9: 52-63.

This paper examines the relationship between industries and the birth rate with the intention of drawing whatever pertinent lesson there may be for problems of economic development. It is found that employment in nonagricultural industries carried on, at, or very near the residence of the woman, and under conditions in which she can combine home and work duties, is conducive to significantly higher fertility--i.e., higher than her fertility would be if she works away from home.

- Janowitz, B. S.
1971 "An Empirical Study of the Effects of Socioeconomic Development on Fertility Rates." Demography 8: 319-330.

Using equations derived from the cross-section and time series data from five European countries during the period that their fertility fell, it is shown that predictions about past fertility changes are in error. The results suggest caution in the use of cross-section relations to predict the course of fertility in developing country.

Janowitz, Barbara S.

1976 "An Analysis of the Impact of Education on Family Size." Demography 13: 189-197.

The author develops and empirically examines a model which decomposes the impact of education into its direct effect (holding labor force participation and age at marriage constant) and indirect effect (varying labor force participation and age at marriage).

Johnson, B. F. and A. J. Meyer

1977 "Nutrition, Health, and Population in Strategies for Rural Development." Economic Development and Cultural Change 26: 1-23.

This paper examines some of the interrelations between socio-economic development and the reduction of fertility and considers priorities among the various components of a strategy for rural development. One of the major conclusions of this study is the need to give a higher priority to rural development and to the expansion of agricultural production on a strategy involving broad participation of the farm population in the process and improvement of nutrition and health and to foster wide diffusion of family planning in rural areas.

Jones, Huw R.

1977 "Fertility Decline in Barbados: Some Spatial Considerations." Studies in Family Planning 8: 157-163.

This study relies upon an areal analysis approach to examine spatial patterns of fertility in Barbados at two time periods, 1960 and 1970. Consideration is given to sex ratios, social class, lack of female education, female employment, and family planning activity to account for spatial patterns of fertility differentials.

Karadayi, F., S. Timur, M. Macura, S. Yener, H. Cillov, H. Tezmen, S. Uner, and H. A. Kisnisei

1974 The Population of Turkey. Ankara: The Institute of Population Studies, Hacettepe University.

This work is an extensive study on factors related to population in Turkey such as employment, education, labor force participation of women, practice of birth control, etc. The book is rich with data.

Kasarda, John D.

- 1971 "Economic Structure and Fertility: A Comparative Analysis." *Demography* 8: 307-317.

This study empirically investigates the relationship between the economic structure and the level of fertility, using data from censuses recently conducted in some 50 nations. Findings show that high rate of female labor force participation outrides home and low rate of economic activity of children depress fertility level.

Knodel J. and V. Prachuabmoh

- 1974 "Demographic Aspects of Fertility in Thailand." *Population Studies* 28: 423-448.

This study reveals that rural women in Thailand experience the highest fertility. Women who marry at older age or who experience disruption of their marriage are more likely to have fewer children ever born.

Kocher, James E.

- 1973 *Rural Development, Income Distribution, and Fertility Decline.* New York: The Population Council.

This work examines the process of rural development with special emphasis on the relationship between components of the rural development and fertility behavior and population growth in low-income countries. The author advances a major hypothesis that "the greater the extent to which the rural population is participating in development, the earlier and more rapid will be the decline in overall fertility and population growth rates." Included among the broad topics discussed are the meaning of development, population prospects, the record on rural development in low-income countries, and rural development and fertility decline.

- 1976 "Rural Development and Demographic Change in Northeastern Tanzania, New Perspectives on Demographic Transition. Occasional Monograph Series No. 4 Washington, DC: Interdisciplinary Communication Program, Smithsonian Institution.

An analysis of the social, cultural, educational, health, and economic changes that have occurred in four rural areas in northeastern Tanzania in relation to fertility change. This analysis was based on interviews of adult members of 1,492 households conducted in a 1973 survey of the four rural areas of northeastern Tanzania. "Data reveal that considerable social, cultural, health, education, and economic changes have occurred in all four rural areas during the past 50 years. Changes were uneven, and where changes were greatest there was a rise in the proportion of women who want no more children despite having small-than-average families."

Krishnamaurty, K.

- 1966 "Economic Development and Population Growth in Low-Income Countries: An Empirical Study in India." *Economic Development and Cultural Change* 14: 7-77.

This study estimates the impact of economic development, as reflected in per capita income and other related variables, on birth and death rates in India for the period of 1922-60 and the results confirm the theoretical expectations.

Krueger, A. O.

- 1974 *Foreign Trade Regions and Economic Development: Turkey*, New York: National Bureau of Economic Research.

This volume discusses and analyzes Turkey's trade and payment regions and its impacts upon Turkish economic growth.

Landau, Y. H. and A. Rokach

- 1971 "Rural Development in Israel," Pp. 486-500 in R. Weitz (ed.), *Rural Development in a Changing World*, Cambridge: MIT Press.

This article describes the process of rural development in Israel since the early years of statehood.

Leibenstein, Harvey

- 1974 "An Interpretation of the Economic Theory of Fertility." *Journal of Economic Literature* 12: 457-479.

This paper reviews and evaluates the major economic theories of fertility along with his own theory. A partial list of elements that are considered to be important in reducing desired and/or actual fertility is presented.

- 1976 "Relation of Economic Development to Fertility." Pp. 473-508 in L. Tabah (ed.), *Population and Economic Development in the Third World*. International Union for Scientific Study of Population.

This paper is an extension of his work of 1974. The purpose is to consider the economic forces that accompany the process of economic development and that, in turn, influence change in fertility. The focus has been on the stage of the economic transition prior to the relatively high per capita income levels that are associated

- Lele, Uma
1975 The Design of Rural Development, Baltimore: The John Hopkins University Press.

In this book, the author discusses rural development perspectives and practices in Africa and draws on evidence from seventeen rural development programs in sub-Saharan Africa to examine the impact of development programs on low-income rural populations. Also, the author identified some of the more basic issues such as land distribution policies, pricing and marketing, manpower, and credit policies that demand attention in order to reduce the gap between overall rural development objectives and actual performance.

- Li, Wen L.
1973 "Temporal and Spatial Analysis of Fertility Decline in Taiwan. Population Studies 27: 97-104.

This paper examines the role of family planning programs in inducing fertility decline in Taiwan and it is stipulated that the dynamics of Taiwan fertility changes may be related to declining infant mortality and accelerating educational development rather than the family planning programs.

- Lorimer, Frank
1954 Culture and Human Fertility. Paris: United Nations Educational, Scientific, and Cultural Organization.

This is an extended theoretical examination of the social organizational factors affecting fertility with special references to the role of kinship structure.

- Malassis, L.
1966 Economic Development and the Programming of Rural Education. Paris: United Nations Educational, Scientific, and Cultural Organization.

This paper is a tentative essay considering rural development in the context of over-all economic growth and agricultural education in reference to the educational system as a whole.

- Malgskar, R. D.
1971 "Industrization of Rural Areas in Developing Countries," Pp. 124-135 in R. Weitz (ed.), Rural Development in a Changing World, Cambridge: The MIT Press.

This article discusses programs of industrization in rural India with an attempt to examine their impact on the rural areas and suggests strategies for development of industries in rural areas.

- Mauldin, W. Parker, Bernard Berelson, and Zenas Sykes
1978 "Conditions of Fertility Decline in Developing Countries, 1965-75." Studies in Family Planning 9:89-148.

A macro analysis of correlates of fertility decline in developing countries of Asia, Latin America, and Africa during the period 1965-75. Education, health, economic status, status of women, population policy and family planning program activities are the correlates of fertility decline examined in the study.

- Maurer, K. M., R. Ratajczak and T. P. Schultz
1973 Marriage, Fertility, and Labor Force Participation of Thai Women: An Econometric Study. Santa Monica: The Rand Corporation.

This joint study seeks to formulate, list, and integrate the components of a theory of fertility as part of a general view of the family decision-making process in Thailand.

- McCabe, James L. and Mark R. Rosenzweig
1976 "Female Employment Creation and Family Size." Pp. 322-352 in Ronald G. Ridker (ed.), Population and Development: The Search for Selective Interventions. Baltimore: Johns Hopkins University Press.

The authors present an argument for encouraging greater female labor force participation as a means of accelerating smaller family size in less developed countries. A framework and methodology are proposed for investigating the impact that such a policy can have on fertility decline in the less developed countries.

- McGreevey, William P., Nancy Birdsall, James Creager, Anne McCook and Bernice Slutsky
1974 The Policy Relevance of Recent Social Research on Fertility. Occasional Monograph Series No. 2, Washington, DC: Interdisciplinary Communications Program, Smithsonian Institution.

A report designed to illuminate the potential relevance of recent social research on the correlates of fertility to decision-making for population policy and implementation. The report includes an analysis of the adequacy of this research as well as research on the effectiveness of family planning programs. Also, the report provides a research agenda believed to be amenable to yielding information that can assist decisionmakers in the mobilization and allocation of resources for population programs.

- McGreevey, William P. and Holmes, David N.
1975 "Population Impact on the Development Perspective ICP/Smithsonian Institution"

This study attempts to identify and assess the impact of specific government policies on fertility in Pakistan. Consideration is also given to policies, programs and projects which have specific objectives other than that of effecting the rate of population growth. From the standpoint of education, the study argues that, in keeping with the findings of others, increased education for greater number of

people will have little short term impact upon fertility. The authors argue, however that the consequences of increased education opportunities, especially more education opportunities for women, will "combine to reduce fertility by about 8%."

McWilliams, John

1974 "Social Development in Africa: The Case of Family Planning." Canadian Journal of African Studies 8:91-107.

The author discusses the possibility of implementing effective family planning programs in Africa without major alterations in the social and economic structure of African society. In addition, the author discusses alternative population programs that may be more appropriate for the developing African nations.

Michaely, Michael

1975 Foreign Trade Regions and Economic Development: Israel, New York: National Bureau of Economic Research

This book reviews and examines the Israeli economy and seeks to develop a framework for analyzing the impact of exchange control liberalization on economy.

Miller, Karen A. and Alex Inkeles

1974 "Modernity and Acceptance of Family Limitations in Four Developing Countries." Journal of Social Issues 30: 167-188.

This article provides a relatively extensive review of the literature on the relationship between societal modernization processes, modernization at the individual level, and the acceptance of family size limitations. The major objective of the article, however, is to test a model which posits that individual modernizing experiences (e.g. education/literacy, mass media exposure, urbanism of residence, occupation and living standard) predict psychological modernity, which in turn predicts acceptance of birth limitation.

Mincer, Jacob

1963 "Market Prices, Opportunity Costs and Income Effects." Pp. 67-82 in Carl Christ (ed.), Measurement in Economics. Palo Alto: Stanford University Press.

This paper pinpoints a class of specification biases that effect the estimation of parameters of economic relations; such biases are a result of neglecting easily overlooked or misunderstood price variables. Price variables are fixed in cross-section study, and cannot be left out of the analysis without creating misinterpretations of income effect.

Mitani, Katsumi

1968 "Key Factors in the Development of Thailand." Pp. 159-210 Committee for Economic Development (ed.), Economic Development Issues: Greece, Israel, Taiwan and Thailand.

This article describes the development program in Thailand since

World War II through 1966 and evaluates the role of the government in guiding the economic development.

Mitchell, Robert E.

- 1972 "Husband-Wife Relations and Family Planning Practices in Urban Hong-Kong." *Journal of Marriage and the Family* 34: 139-146.

This paper focuses on features within the conjugal relationship that activates couples who are predisposed to practice family planning to take positive actions on the matter. The study reveals that women are more likely to practice family planning if they have high levels of influence over family decision-making and have high levels of communication with their spouses.

Mueller, Eva.

- 1971 *Agricultural Change and Fertility Change: The Case of Taiwan*. Ann Arbor: University of Michigan, Department of Economics, Mimeographed.

The paper examines the shift in tastes among farmers for modern consumer durables goods in relation to fertility reduction in Taiwan.

- 1972 "Economic Motives for Family Limitation: A Study Conducted in Taiwan." *Population Studies* 26: 383-402.

The paper examines the economic motives of the family limitation by emphasizing the cost of childbearing and childrearing and the foregone opportunity for mother to seek outside employment. Further, the shift in taste from children to consumer durable plays an important role, too.

Mueller, Eva.

- 1976a "The Economic Value of Children in Peasant Agriculture." Pp. 98-153 in R. A. Ridker (ed.), *Population and Development*. Baltimore: The Johns Hopkins University Press.

This work re-examines and confirms the hypothesis that high-parity children has negative economic value and hence slow the development process. For the analysis, the author considers to what extent in peasant agriculture, male and female children contribute to household expenses, earnings, and savings at various stages and for various family sizes.

- 1976b "The Impact of Agricultural Change on Demographic Development in the Third World." Pp. 307-345 in L. Ta-ah (ed.), *Population Growth and Economic Development*. International Union for the Scientific Study of Population.

This paper examines the impact of economic policy on population growth in less developed countries. The argument is that as agricultural development proceeds, farmer income and other economic variables undergo large changes. This transformation of the farm

household's economic environment is postulated to have an ultimate effect on fertility decision, though the impact is to a large extent indirect.

Mueller, Eva and Richard Cohen

1977 "The Relation of Income to Fertility Decisions in Taiwan." Economic Development and Cultural Change 25: 326-347.

The paper is concerned with the income-fertility relation in Taiwan in 1969. The key finding is that the demand for children does not seem to be subject to an appreciable income effect in those less developed countries where most couples live somewhat above the barest subsistence level. While there is evidence that change in taste and economic attitudes are responsible for some of the fertility decline which accompanies economic development, it is unlikely that these are the only economic factors at work.

Notestein, F.

1945 "Population--The Long View." Pp. 39-45 in T. W. Schultz (ed.), Food for the World. New York: John Wiley and Sons.

This work examines culture and desired family size.

Oshima, Harry and W. H. Lai

1971 "Experience of Labor Absorption in Postwar Taiwan." Paper Presented at the Conference on Manpower Problems in South and Southeast Asia, Singapore, Mimeographed.

This paper investigates the impact of rural development on non-farm employment opportunity for farmers and their children during the postwar period in Taiwan. This outside occupation has become a very important source of income for the farm households.

Paydarfar, A. A. and M. Sarram

1970 "Differential Fertility and Socioeconomic Status of Shirazi Women: A Pilot Study." Journal of Marriage and the Family 32: 692-699.

The hypothesis of the inverse relationship between socioeconomic status and differential fertility is re-examined among 641 Shirazi married women of childbearing age in the City of Shirazi, Iran. The findings show an inverse relationship between the socioeconomic status and fertility rate and that the richer and more educated couples tend to opt for smaller family size.

Psitos, D. A.

1969 "Postwar Economic Problems in Greece." Pp. 22-77 in Committee for Economic Development (ed.), Economic Development Issues: Greece, Israel, Taiwan, Thailand. Supplementary Paper, No. 25.

The study identifies the main factors that have an effect--either positive or negative--on the economic growth of Greece during the entire postwar period through 1966. It also discusses the role of government in guiding or influencing these factors.

- Raper, A. F.
1953 Rural Taiwan--Problems and Promise. Taipei, Taiwan: China-America Joint Commission on Rural Development.

The purpose of this work is to provide a record of the findings of an in-depth rural study carried out in late 1952 in 16 representative areas in Taiwan.

- Ravenholt, R. T. and John C. Chao and Laura Slobey
1977 "Comparative Impact of Family Planning Programs Upon Fertility in Developing Countries." A paper presented at the Annual Meeting of the Population Association of America (April).

A comparative analysis of the impact of family planning programs on fertility in developing countries. The authors note the changes in world population policies and contend that developing countries can take effective action to rescue themselves from excessive fertility through implementing effective family planning programs.

- Repetto, Robert G.
1972 "Son Preference and Fertility Behavior in Developing Countries." Studies in Family Planning 3: 70-76.

This paper reports the results of a study to test a widely-discussed hypothesis about fertility behavior in some less developed countries in Asia and Africa: that the total fertility of couples is directly influenced by the desire to ensure with a high probability, the survival of one or more sons to maturity, whether or not the couples fall within the relatively small subpopulation who have adopted modern techniques of fertility control. The author concludes that son preference is not a factor that influences actual fertility levels and suggests that decisions on family size are more likely to derive from economic considerations.

- 1976 "Direct Economic Costs and Value of Children." Pp. 77-97 in R. G. Ridker (ed.), Population and Development. Baltimore: The Johns Hopkins University Press.

This paper explores the current state of knowledge regarding the effects on fertility decision of changes in direct economic costs and value of children. It also seeks to identify promising means of policy intervention that would reduce fertility in the less developed countries through government action.

Ridker, Ronald G.

- 1969 "Desired Family Size and the Efficacy of Current Family Planning Programmes. *Population Studies* 23: 279-284.

The author discusses the inconclusive state of evidence from several countries on the adequacy of family planning programs in terms of the provision for supplies, services, and education and the belief that the desire among couples to limit family size is sufficiently large. The author proposes that if the fertility rate is to be reduced, additional methods such as monetary incentives seem to be necessary.

- 1976 *Population and Development: The Search for Selective Interventions*. Baltimore: The Johns Hopkins University Press.

A selection of essays on hypothesized socio-economic determinants of fertility assumed to be amendable to policy manipulation in a direction favorable to fertility decline. Income and its distribution, education, value of children, mortality, nutrition, and labor force participation are among the socio-economic variables regarded as determinants of fertility. Many of the essays contain policy implications and policy and program recommendations.

Ridley, Jeanne C.

- 1959 "Number of Children Expected in Relation to Non-familial Activities of the Wife." *Milbank Memorial Fund Quarterly* 37: 277-296.

This study considers the non-familial activities-fertility hypothesis which suggests a negative relationship between non-familial activities of the wife and fertility because of the incompatibility of non-familial and housewife and mother roles. The analysis of this hypothesis reveals that labor force participation has a depressing effect on fertility and is a major factor in the wife's decision to limit family size.

Rosenman A. and G. N. Sykiankis

- 1971 "Rural Development in Greece," Pp. 501-531 in R. G. Ridker (ed.), *Rural Development in a Changing World*. Cambridge: The MIT Press.

"Farming in Greece is both a means of earning a living and a mode of life in Greece." This paper describes the history of rural development since World War II.

Schultz, P.

- 1967 *A Family Planning Hypothesis: Some Empirical Evidence from Puerto Rico*. Santa Monica: The Rand Corporation.

An analysis of the hypothesis that the frequency of the birth in a population can be understood in terms of three factors that affect the desire for birth: a family size goal, the incidence of death among offsprings and the effect of uncertainty in the family formation process.

- 1969 "An Economic Model of Family Planning and Fertility." *Journal of Political Economy* 77: 158-180.

The paper presents an economic model of family planning and proceeds to apply it to explain differences in birth rates among municipalities in Puerto Rico overtime. It is found that the three major factors that affect parents' desire for births are: the numbers of surviving children, the incidence of death, and uncertainty in the family formation process.

- 1970 "Fertility Patterns and Their Determinants in the Arab Middle East." Santa Monica: The Rand Corporation.

This paper attempts to sketch the economic consequences of rapid population growth. The author presents a multivariate statistical analysis of factors affecting fertility in Egypt.

- 1972 "Explanations of Birth Rate Changes over Space and Time: A Study of Taiwan." Santa Monica: The Rand Corporation.

This is an examination of change in age-specific birth rates in several hundred small communities in Taiwan from 1964 to 1969 to obtain more information on the dynamic nature of a model of fertility variation.

- Shevasunt, Somphong, Dennis P. Hogan, and Kwanchai Thaithong
1978 "Fertility and Family Planning in Rural Northern Thailand." *Studies in Family Planning* 9: 212-221.

A review of family planning activities in Thailand along with an assessment of whether widespread adoption of family planning and/or fertility declines have occurred among a rural population that has not undergone substantial social and economic development.

Simon, Julian L.

- 1969 "The Effect of Income on Fertility." *Population Studies* 23:327-341.

Both cross-sectional and time-series data have generally shown an inverse relationship between income and fertility. But short-period time series data over the business cycle have shown a direct relationship. This paper seeks to resolve this paradox by arguing that it arises from a statistical illusion--specification bias due to omitted lagged variables.

- 1976 "Income, Health and Their Distributions as Policy Tools in Fertility Control." pp. 36-76 in R. G. Ridker (ed.), *Population and Development*. Baltimore: John Hopkins University Press.

This paper evaluates various policies intended to reduce fertility in less developed countries by means of changing people's income and wealth. The author concludes that the immediate effect of a rise in income in a traditional subsistence agricultural setting is to increase fertility. However, over the long run, fall in fertility and rise in income go together, after the initial rise in fertility. The long-run linkages between rise in income and decline in fertility are much less clear than is the absent overall empirical relationship.

- Simons, S. B.
1974 "Ambivalence toward Small Families in Rural Latin America." *Social Biology* 27: 323-344.

The purpose of this paper is to analyze social definitions of 'large' and 'small' families in rural Latin America and to examine perceptions of advantages and disadvantages associated with family size.

- Spear, A., M. Spear, H. S. Lin
1973 "Urbanization, Non-Familial Work, Education and Fertility in Taiwan." *Population Studies*: 27-323-334.

This work explores the effects of female labor force participation, education and urbanization on fertility behavior of young wives. The analysis is based on interviews with 3590 women in Taiwan, aged 18-39 in the fall of 1971. The results show that if education is controlled, neither work experience or urban-rural background has much effect on the desired number of children.

- Standing, Guy
1978 *Labor Force Participation and Development*. Geneva, Switzerland: International Labor Office.

This monograph focuses on the economic determinants of labor force participation in low-income industrializing economies. A great deal of emphasis is placed on examining factors influencing the changing economic role of women such as health and nutrition, unemployment, education, and fertility.

- Stavis, Benedict
1974 *Rural Local Government and Agricultural Development in Taiwan*. Ithaca, New York: Cornell University, The Rural Development Center for International Studies

This work describes and analyzes rural local governance and agricultural in Taiwan with an attempt to understand how and under what circumstances rural political institutions influence the patterns of agricultural and rural development. It is found that local government has been very important in generating agricultural change and assuring that most rural people get some benefits from change.

Stevens, R.D.

1976 "Comilla Rural Development Programs to 1971." Pp. 95-128 in R.D. Stevens, H. Alavi and P.J. Bertocci (eds), Rural Development in Bangladesh and Pakistan. Honolulu: The University Press of Hawaii.

This article focuses on the nature and status of six major rural development programs originating at the Academy for Rural Development in Comilla, Bangladesh. The study reveals that the social and economic transformation of low-income developing societies is dependent upon the continuous flow into rural areas of investments in modern technology with high economic returns.

Stycos, Mayone and Robert H. Weller

1967 "Female Working Roles and Fertility." Demography 4: 210-217.

Using survey data gathered in Turkey in 1963, the relationship between female employment status and fertility is examined. Controlling for urban-rural residence, education, and exposure to conception within marriage, no difference in fertility by labor force status appears.

Stycos, J. Mayone

1968 Human Fertility in Latin America. New York: Cornell University Press

This book provides a sociological perspective on fertility in Latin America. The author's point of departure is a general discussion on the world population problem, Latin America population problem, and the attitudes of Latin American intellectuals toward the population problem. The author proceeds to assess the influence of Latin America social norms and a structure on fertility. In this regard, the attitudes toward family size and birth control practices are discussed along with the impact of family stability, female employment, education, and urbanization on fertility. Finally, the author discusses prospects for enhancing fertility control in Latin America.

Stys, W.

1957 "The Influence of Economic Conditions in the Fertility of Peasant Women." Population Studies 11: 136-148.

In this paper, which is based on an inquiry carried out in 20 villages in Southern Poland, the author examines the fertility of two consecutive generations of peasant women. It is found that the richer the couples are, the more children they have. This is due to the earlier marriage of wealthier peasant girls, who thus begin to bear children sooner, and also bear them more frequently and for a longer period.

Teitelbaum, M.S.

- 1975 "Relevance of Demographic Transition Theory for Developing Countries." Pp. 174-179 in P. Reining and I. Tinker (eds), Population, Dynamic Ethics, and Policy. Washington, DC: American Association for the Advancement of Science.

The paper examines demographic transition theory and concludes that the theory offers only partial explanation of European trends and ambiguous advice for developing countries.

Tsuchiya, Keizo

- 1972 "Population Growth and Technological Progress in Japanese Agriculture." Seminar on Effects of Agricultural Innovations in Asia on Population Growth, Manila, Mimeographed.

This work provides an extensive analysis of the impact of technological progress on economic growth and population decline. One of the key findings was, that farmers who are more receptive to new farming methods tend to be more inclined to adopt birth control practices.

Tsui, Amy Ong and Donald J. Dogue

- 1978 "Declining World Fertility: Trends, Causes, Implications." Population Bulletin 33:3-42.

The focal points of this paper are: (1) an examination of the evidence that the world's fertility has declined in recent years, (2) an analysis of the factors which appear to be associated with the apparent world's fertility decline and (3) implications for fertility and population growth rates to the end of the century. Based on compilation of estimates available for all nations of the world, the authors derive estimates which indicate that the total fertility rate declined from 4.6 to 4.1 births per woman between 1968 and 1975, due largely to the unanticipated rapid and universal decline in the fertility of less developed countries. The relationship of several socio-economic development indicators and the 1972 family planning effort with fertility was empirically examined. The socio-economic development indicators included per capita gross national product, percent of the population living in urban areas, infant mortality rates, life expectancy at birth, percent of employed women working in agriculture, percent literate of the population, and male and female school enrollment ratios. The authors indicate that the socio-economic progress made by the LDC's during the period was not significant enough to account for more than a small proportion of the fertility decline and the organized family planning programs were a major contributing factor. The authors predict that by the year 2000 less than a fifth of the world's population growth (2.1 percent or more annually). However, they warn that this prediction is premised upon a continued organized family planning effort.

Tsui, Amy Ong, Jay D. Teachman and Donal J. Bogue

1978 "Predicting Fertility Trends in LDC's Over the Next Century."
A paper presented at the Meeting of the Population Association
of America, Atlanta, Georgia.

As a means of predicting fertility trends in LDC's over the next century, the authors of this study: (1) present an assessment of the world and regional fertility situation in 1968 and 1975 and the amount and tempo of change over that period; (2) analyze the assumed causal factors of the fertility change (both socio-economic and demographic factors, including family planning effort; and (3) provide a translation of the rate of decline in total fertility over the century of 2075 for three developing regions--Asia, Africa, and Latin America and 15 heavily populated countries. The authors suggest that their analysis confirms and strengthens what others have noted with regard to the efficacy of family planning as a means of regulating population growth and facilitating overall social improvement. To maintain and even accelerate the rate of fertility decline, the authors believe that it will be necessary to intensify resource inputs into organized family planning programs in LDC's.

Weller, Robert H.

1969 "Role Conflict and Fertility." *Social and Economic Studies* 18:263-272.

This paper examines the relationship between mother and worker roles and concludes that in less developed countries there tends to be an absence of conflict between these roles.

Weintraub, R.

1962 "The Birth Rate and Economic Development." *Econometrica* 30: 812-817.

This study estimates the effect of economic growth on the birth rates and finds that infant mortality and urbanization all will reduce fertility but the income effect appears likely to keep higher birth rate.

Williams, Anne D.

1975 "Determinants of Fertility in Developing Countries." Pp. 119-159 in M.C. Keeley (ed.), *Population Public Policy and Economic Development*. New York: Praeger Publishers.

This article reviews and evaluates available literature on the determinants of fertility in developing countries.

Williamson, J.

1970 "Subjective Efficacy and Israel Family Size as Predictions of Favorability Toward Birth Control." *Demography* 7: 329-340.

This study is an assessment of the relevance of subjective efficacy and ideal family size as predictors of favorability toward birth control. It is found that the effects of ideal family size and subjective efficacy are generally strongly related to those of education and the other variables that are considered.

Yang, Jae Mo, Sook Bang, Myung Ho Kim, and Man Gap Lee
1965 "Fertility and Family Planning in Rural Korea." Population Studies
18: 237-250.

This article reports on the preliminary results of a research project designed to demonstrate and assess the impact of family planning-educational and clinical services on fertility rates in two rural Korean townships. Data are presented and analyzed from two surveys of a random sample of residents in each of the townships. The first survey covered attitudes and practices related to family planning. The second survey, conducted after over a year of intensive family planning programming in the townships, focused on changes that had occurred in fertility rates and in the practice of contraception control. Both townships were of similar size and characteristics, however, the family planning program in one of the townships was considered to be more intensive than in the other.