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PERSPECTIVES ON POPULATION AND DEVELOPMENT

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Between 1960 and 1980 world population increased from approximately 3 billion to 4.4 billion persons. The annual rate of population growth during this period — 1.9 per cent per year — was higher than at any previous period in human history. During this same period concern about the relationship between population growth and development re-emerged as a major theme in development thought and development policy.

In the classical model population growth was believed to be dependent on the quality of agricultural resources. Diminishing returns to increments of labour and capital applied to a constant quality of land was both a source of poverty and a constraint on growth.[1] In contemporary discussion the classical perspective has provided the primary theoretical foundations for the "limits to growth" literature.[2] A major thrust of much of the theorizing in the 'dual economy' tradition was to identify the conditions that would permit a poor society to escape from a Malthusian trap in which the marginal productivity of labour in the rural areas was at or below the subsistence wage rate.[3] At a more popular level the 'population bomb' has been blamed for many or even most of the ills of the world — including hunger, poverty, population and psychological stress and war.

The perspective on the relationship between population growth and development that emerges from more recent development thought is much more complex. In the theory of induced innovation, for example, changes in relative resource endowments, such as changes in the ratio of agricultural labour to land, are viewed as directing techni-

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1. Useful discussions of the classical model are presented in Erskine McKinley, "The Theory of Economic Growth in the English Classical School", in Burt F. Hoselitz *et al.* (Eds.): Theories of Economic Growth, The Free Press, Glencoe, 1960, pp. 89-112; Irma Adelman: Theories of Economic Growth and Development, Stanford University Press, Stanford, 1961; Luigi L. Pasinetti: Lectures on the Theory of Production, Columbia University Press, New York, 1977, pp. 8-18.

2. The seminal document in the most recent wave of concern about natural resource scarcity is Dennis H. Meadows *et al.*: The Limits to Growth, Universe Books, New York, 1972. For a review of this literature, see Glenn Fox and Vernon W. Ruttan, "A Guide to LDC Food Balance Projections", *European Review of Agricultural Economics*, Vol. 10, No. 4, 1984, pp. 325-356.

3. Yujiro Hayami and Vernon W. Ruttan: Agricultural Development: An International Perspective, The Johns Hopkins University Press, Baltimore, 1971, pp. 17-24.

cal change along a path that permits the substitution of relatively abundant factors for the relatively scarce factors of production. Thus, the induced innovation perspective directs attention to the conditions under which the growth of population induces agricultural productivity growth and the conditions under which resource endownments act as a constraint on growth of productivity in the rural areas.[4]

HISTORICAL PERSPECTIVES

The argument that population growth is a necessary condition for the development of intensive systems of agricultural production has been argued most forcefully by Boserup.[5] Boserup's study of the historical development of farming systems leads her to view soil fertility and intensity of cultivation as dependent variables.[6] Her review of historical experience indicates that in the ancient world a necessary condition for urbanisation was a sufficiently large and dense rural population.[7] Even under the most favourable circumstances the agricultural surplus that could be produced by a farming family was small. Transportation was expensive. Areas dependent on land transport were forced to rely on agricultural surpluses that could be assembled within a relatively few kilometres. Investments in transport improvement, such as the imperial canal system in China, could be economically supported only under conditions of high population density and intensive agricultural production.[8]

Intensification of agricultural production involved the substitution of labour for land — through labour intensive capital improvements (irrigation, drainage, terracing), labour intensive production practices (weeding, manuring, inter-cropping), and shifts to a commodity mix

4. Hayami and Ruttan: *op. cit.*, pp. 43-63; Hans P. Binswanger and Vernon W. Ruttan: Induced Innovation: Technology, Institutions and Development, The Johns Hopkins University Press, Baltimore, 1978, pp. 13-42.

5. Ester Boserup: The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure, Aldine, Chicago, 1965; Ester Boserup: Population and Technological Change: A Study of Long-Term Trends, The University of Chicago Press, Chicago, 1981.

6. ". . . in primitive agriculture there is no sharp distinction between cultivated and uncultivated land and it is impossible, likewise to distinguish clearly between the creation of new fields and the change of methods in existing fields . . . The time-honoured distinction between cultivated and uncultivated land is replaced by the concept of frequency of cropping . . . Soil fertility, instead of being treated as an exogenous or even unchangeable initial condition . . . takes its place as a variable, closely associated with changes in population density and related changes in agricultural methods." Boserup: The Conditions of Agricultural Growth, *op. cit.*, p. 13.

7. Boserup: Population and Technological Change, *op. cit.*, pp. 63-74.

8. Transportation continues to be an area where costs are reduced by intensive development. See Donald Glover and Julian Simon, "The Effects of Population Density Upon Infrastructure: The Case of Road Building," *Economic Development and Cultural Change*, Vol. 23, No. 3, April 1975, pp. 453-468.

that could productively absorb more intensive use of labour inputs (such as the shift from upland crops to wet rice in East Asia). Under these conditions output per unit of land rose while output per unit of labour input declined. The decline in output per unit of labour input (per hour or per day) was partially or wholly offset by an increase in the number of hours or days of agricultural labour input per year.

The Boserup argument that a labour intensive system of agricultural production was essential for the production of the agricultural surpluses necessary for the emergence of urban civilization in Mesopotamia, Mesoamerica and East Asia is firmly grounded in economic history. The impact of population growth in inducing indigenous improvements in agricultural technology in contemporary peasant societies has also been documented by Boserup.[9] Her insistence on the importance of population growth in inducing the development of intensive systems of agricultural production is an important correction to the view that agricultural technology in primitive or traditional societies was essentially static.

The experience of pre-industrial Western Europe suggests, however, a somewhat less optimistic view of the relationship between population and economic growth. According to Ronald Lee, the economy of pre-industrial England "could absorb population growth at about 0.4 percent per year with little effect; deviations above or below this trend, however, had dramatic consequences .... a 10 percent increase in population depressed wages by 22 percent; raised rents by 19 percent; lowered industrial prices relative to agricultural prices by 17 percent; raised the rates of industrial agricultural production by 13 percent; and lowered labor's share of national income by 14 percent."[10]

One of the characteristics of economic growth in the developing countries in the decades immediately after World War II was an acceleration of population growth. Rapid progress in the control of infectious, diarrhoeal and parasitic disease has resulted in a sharp reduction in death rates. The concentration of mortality reduction in the youngest age groups has resulted in severe disequilibrium in the relationship between fertility and mortality. This disequilibrium is evidenced in an excessively high proportion of the total population in the dependent

9. The Boserup results for contemporary developing economies have recently been confirmed in a more formal analysis of the impact of population growth in North India. The results suggest that the "Boserup effect" tends to mitigate, but not to completely offset the "Malthusian effect". Robert E. Evenson: Population Growth in North India, Yale University Economic Growth Center, New Haven, February 1983.

10. Robert D. Lee, "A Historical Perspective on Economic Aspects of Population Explosion: The Case of Preindustrial England", in Richard A. Easterlin (Ed.): Population and Economic Change in Developing Countries, University of Chicago Press, Chicago, 1980, p. 547.

ages.[11] The dependency burden has acted to depress physical savings and capital formation. A higher share of private and public sector capital formation is required to maintain existing levels of physical capital rather than to enhance per capita consumption.[12]

There are few societies in the latter half of the twentieth century where it could convincingly be argued that either the level of population density or the rate of population growth is so low as to represent a serious constraint on the growth of per capita output or income. And we can identify numereous situations where the impact of population growth on income and welfare is not dissimilar to that described above for pre-industrial Europe. In the Philippines, for example, the number of landless workers has risen and real wage rates have declined throughout the 1960's and 1970's. Studies by the International Labour Organization have indicated similar trends in a number of other countries.[13]

One of the implications of the model of induced institutional innovation is that as population pressure against the land rises, and the value of labour declines relative to other resources, we can expect changes in family behaviour and the emergence of new institutions that limit the rate of population growth. Such changes have occurred in the past under conditions of severe pressure of population against land resources. In Japan, population growth was traditionally limited by

11. This disequilibria is reflected most dramatically in the growth in the population in the 20-39 year age group. In the developed countries this age group increased by 58 million persons and in the less developed countries by 360 million persons between 1960 and 1980. Between 1980 and 2000 the increase in this age group in the developed countries is expected to be 17 million and 600 million in the less developed countries. There are large differences among developing countries. For example, the increase in the 20-39 year age group is expected to rise from 68 million in 1960-1980 to 142 million in 1980-2000 in India and to decline from 116 million in 1960-1980 to 92 million in 1980-2000 in China. See Paul Demeny, "The North-South Income Gap: A Demographic Perspective", *Population and Development Review*, Vol. 7, June 1981, pp. 297-310.

12. T. Paul Schultz: Economics of Population, Addison-Wesley, Reading, Massachusetts, 1981, pp. 44-47.

For a vigorous defense of rapid population growth, see Julian L. Simon: The Ultimate Resource, Princeton University Press, Princeton, 1981. Simon argues: " . . . the most important effect of population size and growth is the contribution of additional people to our stock of useful knowledge. And this contribution is large enough to overcome the costs of population growth" (p. 197). But Simon fails to deal with the short run trade-off between the investment in human capital necessary to enable those who are already born to contribute to the advancement of knowledge and the costs of maintaining even the low levels of investment in human capital formation that prevails in most developing countries for a higher level of population.

13. Keith Griffin and A. R. Khan: Poverty and Landlessness in Rural Asia, International Labour Organization, Geneva, 1977. The results of the ILO studies are summarised in Keith Griffin: International Inequality and National Poverty, Holmes and Meier, New York, 1978.

practices such as abortion and infant exposure. Similar practices to limit population growth were also common in the more densely populated areas of Western Europe. These traditional institutions tended to atrophy under conditions of rapid economic growth.[14] During the 1960's and 1970's, however, there was a rapid growth of both technical and institutional innovations designed to facilitate individual control over reproductive behaviour.[15]

ANALYTICAL PERSPECTIVES

Within the fields of population policy and population research there has been a continuing argument over whether changes in population growth rates are primarily induced by factors that act to reduce the demand for children or by supply-side factors that act to reduce the cost of fertility control. Some scholars have maintained that changes in rates of population growth, resulting from declining birth rates and increasing longevity, have been primarily a response to economic growth. Other scholars have insisted that a combination of unavailability of suitable birth control technology and the lack of knowledge about birth control has limited the ability of families in developing countries to control family size.[16]

These intellectual debates were in part a reflection of ideological debates about the relative priorities of demographic and economic change. At the World Population Conference in Bucharest in 1974, for example, the organizers of the conference, supported by most of the developed country delegations, expected that the conference would endorse a resolution to strengthen commitments by national governments and international agencies to stronger efforts to implement anti-natalist policies. The leaders of a number of developing country delegations succeeded, however, in committing the conference to the position that economic and social development is a necessary pre-requisite to reduction in popu-

14. For a survey of traditional methods of population limitation, see Virginia Abernethy: Population Pressure and Cultural Adjustment, Human Sciences Press, New York, 1979.

15. Henry P. David, "Incentives, Reproductive Behavior, and Integrated Community Development in Asia", *Studies in Family Planning*, Vol. 13, May 1982, pp. 159-173.

16. Within the 'demand induced' school there have also been two major traditions. One seeks to explain trends in fertility in terms of relative income status of successive birth cohorts. A second attributes both trends and cross-section differences in fertility to differences in the relative value of human time. Richard A. Easterlin, Robert A. Pollak and Michael L. Wachter. "Toward a More General Economic Model of Fertility Determination: Endogenous Preferences and Natural Fertility", in Richard A. Easterlin (Ed.): Population and Economic Change in Developing Countries, University of Chicago Press, Chicago, 1980, pp. 81-135; see also T. Paul Schultz, "Current Development in the Economics of Fertility", in Economic and Demographic Change: Issues for the 1980's, International Union for the Scientific Study of Population, Liege, Belgium, 1978, pp. 4.1-11.

lation growth rates. They then sought to achieve commitment by the developed countries to restructuring the international economic system along lines more favourable to the developing countries.[17]

During the 1970's research conducted within the framework of the 'household economics' paradigm has helped to resolve some of the disputes over the relative importance of the several factors operating to influence fertility. The distinctive feature of the household economics paradigm that has made it so fruitful as a guide to empirical research in areas such as fertility behaviour is that it explicitly treats the non-market as well as the market activities of the household as amenable to economic analysis.[18]

The structure of the theory includes the following elements: (a) Utility is derived from goods and services which are 'produced' by combining market goods, household capital, and household labour rather than directly from market goods. (b) The resources devoted to the production of household goods and services can be measured in economic terms since they could be devoted to alternative uses including production for the market. (c) Household production is broadly defined to include goods and services not normally traded in the market such as 'child services' which are produced from market goods (such as food, medicine and clothing) and home services (such as child care and food preparation). (d) The concept of income is expanded to include the 'full' value of home produced goods and services as well as goods and services bought or sold in the market. (e) The household allocates the time of its members and its household capital between market activities (wage or self-employment), home production activities, and leisure.

In making these decisions the household is confronted with both market prices and 'shadow prices' which reflect the opportunity costs (or

17. Jason L. Finkle and Barbara B. Crane, "The Politics of Bucharest: Population, Development and the New International Economic Order", *Population and Development Review*, Vol. 1, September 1975, pp. 87-114. The arguments at Bucharest bear a remarkable resemblance to the dialogue between Malthus and Goodwin. See William Peterson, "The Malthus-Goodwin Debate: Then and Now", *Demography*, Vol. 8, 1971, pp. 13-26.

18. For useful expositions, see Mark Nerlove, "Household and Economy: Toward a New Theory of Population and Economic Growth", *Journal of Political Economy*, Vol. 82, Part II, March/April 1974, pp. S200-X218, and T. Paul Schultz: Economics of Population, *op. cit.*, pp. 62-101. For the results of empirical research conducted within the household economic tradition, see *Philippine Economic Journal* (special issue on Philippine Household Economics), Vol. 17, Nos. 1 and 2, 1978 and Hans P. Binswanger, Robert E. Evenson, Cecilia A. Florencio and Benjamin N. F. White (Eds.): Rural Household Studies in Asia, University of Singapore Press, Singapore, 1980. The exposition in this section draws very heavily on Robert E. Evenson, "Notes on the New Home Economics", Miriam Seltzer (Ed): Home Economics and Agriculture in Third World Countries, University of Minnesota College of Home Economics Center for Youth Development and Research, St. Paul, Minnesota, 1980.

value in alternative use) of household resources. It also confronts the prices of market goods, market wage rates, the availability of household capital and a household production function which reflects the efficiency with which market and non-market goods can be transformed into household utility.

The reason that the household model has been such a powerful instrument in opening up new insights into fertility behaviour is that child bearing and rearing is so intensive in the use of mothers' time. Home production activities are also central to the health and nutrition of children and to schooling performance. Evidence from rural India, for example, suggests that expenditures on schooling and health are viewed as substitutes for fertility. Thus, reductions in the costs of schooling and investment in health maintenance will lead to a decline in family size. [19]

Evenson has summarised, from a large number of studies in Asia, the implications of changes in a number of policy related variables: (a) The effect of wealth, of income from sources other than wages, on the number of children is positive. Wealth is also positively related to child health and schooling. (b) A rise in the value of the mother's time in either market or non-market activities has a positive effect on the demand for contraceptive services and a negative effect on fertility. (c) An increase in the value of the father's labour earnings has a positive effect on fertility, child health and schooling. (d) Earning opportunities for children have a positive effect on completed family size and a negative effect on children's schooling. (e) Increases in the level of mother's schooling has a negative effect on fertility and infant mortality and a positive effect on nutrition and children's schooling. [20]

In many respects the findings of the research carried out within the framework of the household economics paradigm in the 1970's have parallel findings about the behaviour of subsistence peasant producers in the late 1950's and early 1960's. These studies tended to confirm the 'poor but efficient' hypothesis suggested by Theodore Schultz — that

19. Mark R. Rosenzweig and Kenneth I. Wolpin, "Governmental Intervention and Household Behavior in a Developing Country", *Journal of Development Economics*, Vol. 10, 1982, pp. 209-225. See also Mark R. Rosenzweig and T. Paul Schultz, "Child Mortality and Fertility in Colombia: Individual and Community Effects", *Health Policy and Education*, Vol. 2, 1982, pp. 305-348.

20. Mark R. Rosenzweig and Robert E. Evenson, "Fertility, Schooling and the Economic Contribution of Children in Rural India", *Econometrica*, Vol. 45, July 1977, pp. 1065-1079; Evenson, "Notes on the New Home Economics," *op. cit.*, pp. 16-20. For a concise review of both the findings and the ambiguities from "the new household economics" approach to the study of fertility, see T. Paul Schultz, "A Review of Caldwell's Theory of Fertility Decline," *Population and Development Review*, Vol. 9, March 1983. See Benjamin N. White, "Rural Household Studies in Anthropological Perspective", in Binswanger *et al.* (Eds.): Rural Household Studies in Asia, *op. cit.*, pp. 1-25 for a critical perspective.

peasant producers in traditional agriculture are rational, efficient resource allocators and that they remained poor because there were only limited technical and economic opportunities to which they could respond.[21]

It now seems clear that poor families in traditional societies can also be viewed as efficient allocators of the household resources available to them in making decisions about fertility, about the health and education, and about the market and non-market production activities of family members. They continue to have large families because of the unsatisfactory contraception technology available to them, because of high child mortality rates, because children begin to make substantial contributions to family income at an early age, and because low productivity in household and market production places a low value on the time of the mother.

IMPLICATIONS FOR POPULATION POLICY

These findings have important implications for population policy. It is unlikely that substantial changes in fertility behaviour will occur as a result of attempts to change the values or motivations of poor families. Reductions in the demand for children can be expected from (a) growth in non-agricultural employment opportunities, (b) from improvements in agricultural techonology that increase the value of mother's time in either market or household production, (c) from improvements in health that reduce infant mortality, or that increase the life expectancy of children, and (d) from opportunities to profit from investment in education.

The findings, therefore, support the view that economic development exerts a powerful impact on fertility. But the findings also support the view that programmes that operate through their impact on the supply of children also can be effective. Programmes that provide more efficient birth control technologies that can substitute for traditional methods can also be expected to reduce fertiliy and increase family resources devoted to health and schooling.[22] These programmes reduce both the market and non-market costs of fertility control. The evidence is clear that poor families in poor countries respond to such cost reductions. And programme activities that reduce the cost of fertility control are among the few policy instruments available to governments that want to speed the process of demographic transformation.

21. Theodore W. Schultz: Transforming Traditional Agriculture, Yale University Press, New Haven, 1964.

22. For an analytical discussion, see T. Paul Schultz: Economics of Population, *op. cit.*, pp. 177-180.

Thus, the analysis, conducted within the new household economic paradigm, leads to policy conclusions that are not unlike the conclusions of the older 'family planning' school.

A remarkable, and completely unexpected result of the findings on household behaviour with respect to fertility is that it shifts attention from decision-making at the household level to public policy! Individual households can no longer be viewed as the primary constraint on efforts to reduce fertility.

The major challenge that now faces students of population policy is to obtain a better understanding of the forces that induce a national government to institute more effective schooling, health and family planning programmes. Our knowledge in this area is relatively limited. Nor do we understand fully what explains the strength of demand by parents for their children's schooling among so many of the world's poorest people. It does seem clear that elements such as population density, programme management capacity, cultural traditions and level of economic development are important in inducing such decisions at both the public and the family level. The availability of external assistance for the design of population programmes and for the supply of birth control materials also appear to carry some weight.[23]

The 1970's witnessed a convergence of factors that have resulted in declining fertility and population growth rates across a much broader front than many observers believed possible in the early 1970's.[24] A decade ago the number of poor countries that had made significant progress in the transition to lower fertility rates were relatively few — Taiwan and South Korea. By the early 1980's a substantial number of countries in Asia and Latin America had experienced a measurable decline in fertility.[25] In spite of the limitations in our knowledge of individual and group behaviour there is little doubt that policies and technologies are available to substantially reduce the cost of fertility control for poor families.

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23. For a useful review, see Gayl D. Ness and Hirofumi Andon: The World is Shrinking: Population Planning in Asia, The Johns Hopkins University Press, Baltimore, forthcoming 1983.

24. The significance of recent data on fertility decline for long run population growth trends has been a subject of considerable debate. See Amy Org Tsui and Donald J. Bogue: Declining World Fertility: Trends, Causes, Implications, Population Reference Bureau, Washington, D.C., 1978; Paul Demeny: On the End of the Population Explosion, The Population Council Working Paper No. 30, New York, March 1979.

25. W. Parker Mauldin, "Population Trends and Prospects", *Science*, Vol. 309, July 1980, pp. 148-157.