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**Assessing the Demographic Impact of Development Projects:
The IDRC Experience**



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INTRODUCTION

Over the past eight years, Canada's International Development Research Centre (IDRC) has funded about twenty research projects on the impact of development policies and projects upon household demographic behaviour, focusing particularly on poor rural areas of Third World countries. About three-quarters of these projects have now been completed and reports have been written on their results. The remainder are still ongoing.

Most of the completed studies were conducted within a loose "network" of research projects, involving researchers from Asia, Latin America and Africa. This workshop is, in fact, timely from my point of view, because it coincides with the completion and submission of a manuscript incorporating a selection of these studies to IDRC for publication consideration. As co-editor of this manuscript I have come to know these projects well and have reached some conclusions regarding the value of such research in terms of its methodological approaches and substantive findings. In the present paper three studies have been selected, two (Philippines and Bangladesh) from the above-mentioned network, and one (Thailand) which was funded independently of the network. Although these projects shared fairly similar objectives, they adopted different methodological approaches. Taking the three as case studies, I will argue that certain methods have been shown to be superior in that they cast greater light on the complex interactions between development projects and demographic

behaviour, and that they are therefore of more direct utility to policymakers.

In the subsequent section the three studies are briefly described: their objectives, research design and main findings. The third section of the paper describes the kinds of results obtained from these studies in terms of their theoretical and practical insights, and relates these observations to the methods employed. In arguing for the superiority of certain approaches, it should be emphasized that no criticisms are intended of the particular studies in terms of their inherent value or the competence which they were conducted. In fact, one of the reasons for selecting these projects is their essentially high quality and scientific rigour. The point is rather to argue that even though all approaches have certain merits, some have comparative advantages for this kind of impact analysis. The paper concludes with a few general observations regarding what has been learned so far about the impact of development programs upon demographic behaviour from the IDRC experience more broadly.

THREE ASIAN CASE STUDIES

(1) Impact of Reforestation on Child Mortality and Fertility - Thailand

Thailand's reforestation program is one of the most important development projects in the country. In order to make way

for agricultural expansion, rapid deforestation took place over the past two decades, creating a precarious environmental situation in terms of ecological balance, climatic conditions and water resources. In order to address this problem the Thai Government introduced a reforestation program during its first national economic and social development plan of 1961-1966, and this program has continued to the present time. The program sets targets to be met by each Five-Year Plan, aimed at reforesting a designated number of "rai" (2.4 rai = 1 acre) through the establishment of national forest parks and "reforestation villages".

Until 1967 all reforestation activities were conducted by the Royal Forest Department but thereafter two state enterprises, the Forest Industry Organization (FIO) and the Thai Plywood Company, were permitted to undertake reforestation projects. The FIO, a governmental enterprise financed by profits from timber sales, took primary responsibility for the program. The FIO recognized the dual, conflicting demands being placed on forest lands by the rural inhabitants for agricultural expansion and for reforestation to maintain the forest stock. Thus, in addition to developing teak and other wood plantations, the FIO began in 1968 to establish "forest villages" for the rural inhabitants.

The FIO and Royal Forest Department reforestation programs and associated forest villages were intended: to assemble and settle rural populations and shifting cultivators in certain

areas to prevent further clearing of land; to provide, through the creation of forest villages, a ready supply of labour for forest improvement activities including nursery work, planting, weeding, pruning, thinning and pesticide spraying; to improve the economic and social conditions of the settlers through the provision of amenities such as water supply, electricity and roads, social services including health care, family planning and education, and wage employment opportunities related to forest activities; and to encourage the inhabitants to grow crops both for subsistence and for additional cash income. To this end, each family was provided with a plot of land. Crops grown would be similar to those normally grown by rural inhabitants, such as rice, ground nuts, beans, tobacco, tapioca, and other types of fruits and vegetables.

Given the nature of the forest village scheme (provision of land, employment opportunities, amenities and social services), it was hypothesized that significant economic and social benefits such as greater household income, better health and higher educational levels, would result. It was also expected that the changes in economic and social development would have important demographic implications, especially with respect to infant mortality, a very sensitive indicator of the level of socio-economic development, and fertility.

The principal objective of the study, undertaken by Pisit Sukreeyapongse and his colleagues at the Faculty of Environment and Resources Studies and of Environmental Social Sciences Program, Mahidol University, was to assess the social, economic and demographic effects of the reforestation program in Northern and Northeastern Thailand, the regions where problems of deforestation had been most severe, and to recommend appropriate improvements in the reforestation program based on the research findings.

The methodology consisted of the selection of a two-stage stratified sample, including 90 villages and 60 households per village, representing 30 reforestation villages, 30 adjacent villages which were affected by the reforestation program insofar as their residents obtained employment in the reforestation activities, and 30 distant villages not involved in or influenced by the program. The methodology consisted of a cross-sectional survey, and included interviews with village chiefs, community leaders, household heads and wives of household heads. Data were collected from 5,360 households, about 2/3 of which were located in the North region, and 1/3 in the Northeast. The data were analyzed by means of multiple regression and path analysis.

The main findings of the survey may be summarized as follows:

- (1) rural-urban migration was slowed by the reforestation program, illustrated by lower out-migration from the reforestation households than from the non-program ones;
- (2) incomes and employment were higher in the reforestation villages than in the other communities;
- (3) the reforestation program benefitted not only the reforestation villages but also the surrounding communities by providing employment, additional income, and better communications;
- (4) social problems, including drug addiction and thievery, were more prevalent in the reforestation villages than in the non-program areas;
- (5) child malnutrition and morbidity were more prevalent in the reforestation villages; and,
- (6) there was some indication that fertility in the reforestation villages was lower than that of the other communities, at least in the Northern region; although among women aged 35 and over, fertility was higher in the program villages. In the Northeast, however, fertility was higher in the reforestation areas than in the others, perhaps because the former were relatively less developed and poorer than the more established communities. Within the reforestation

villages themselves, employment of women in the reforestation activities was negatively related to their recent fertility, implying that the reforestation program was having a depressing impact on previously high levels of childbearing in these communities.

(2) Impact of BARD Comilla Program - Bangladesh

The Comilla Program was established in 1959 by the Pakistan (later Bangladesh) Academy for Rural Development (BARD) as a pilot project to increase the agricultural production of rural cultivators, both to improve their incomes and to enlarge the nation's food supply. It involved a broad-based integrated rural development program in the previously backward district of Comilla-Kotwali, and included agricultural extension, credit cooperatives, the introduction of improved varieties of paddy and supplementary inputs such as irrigation, fertilizers and pesticides. The physical infrastructure was also strengthened to include better educational facilities, opportunities for female employment and family planning services.

The objective of the study, conducted by Barkat-e-Khuda of the University of Dhaka, was to examine the impact of the Comilla Program on demographic behaviour in a selected village, Sreebollobpur, in the program district. The village had been exposed to the BARD program for about two decades, and had a population of 1466 persons at the time of the survey in 1979.

The methodology involved both a micro-level study, using participant observation, and the collection of quantitative data by means of questionnaires. A census of households was undertaken, followed by several highly focused smaller surveys covering 50%-70% of all households. The quantitative data were analyzed mainly in the form of cross-tabulations.

The principal results of the study were as follows:

- (1) the most dramatic changes arising from the agricultural development programs were economic: rice production per acre increased as a result of the application of fertilizers, pesticides and irrigation; and high-yielding varieties were adopted by 75% of the households. Demand for labour reduced unemployment in the area, and incomes were higher than those of the general Bangladesh population;
- (2) levels of literacy increased, as did access to and utilization of health facilities; tubewells replaced contaminated sources of drinking water and better communications allowed for the diffusion of modern ideas;
- (3) contraceptive use was much more prevalent in Sreebollobpur than in Bangladesh as a whole, the pill and condom being the most popular methods;

- (4) fertility was considerably lower in the study village than in the nation overall: Shreebollobpur women aged 40-44, for example, had borne 6.0 children on average in 1979, compared to 7.1 for Bangladesh in 1975-76; and,
- (5) villagers generally had lower fertility ideals and were less traditional with respect to son preference than had been found in surveys conducted elsewhere in Bangladesh.
- (3) Impact of Green Revolution and Family Planning on Two Rural Municipalities - Philippines

In a longitudinal study of two rural areas of Southern Mindanao, Magsaysay and Matanao, Robert A. Hackenberg examined the impact of a number of development activities over the 1970-1980 decade. At the time of the baseline study in 1970 the two municipalities were characterized by different levels of development. Both had experienced heavy in-migration as a result of a government policy to encourage frontier expansion and to accommodate a rapidly growing population. Between 1948 and 1960, more than two million migrants homesteaded farms in Mindanao. In the mid-1960's, due to the depletion of land reserves, the frontier was closed to further settlement.

Magsaysay, the more progressive of the two study sites, was the first village in the area to accept miracle rice and hand tractors. Moreover, its industrious population of Ilocano

migrants were familiar with irrigated rice technology. Matanao, by contrast, was a hilly upland area where Cebuano migrants relied upon the production of three corn crops per year and where the threat of soil depletion was imminent. Both the Ilocanos and the Cebuanos originated in areas of very high fertility and, as labour was in demand and the age structure of the population young, it seemed probable that rapid growth would continue for some time. However, at the time of the baseline survey, Hackenberg hypothesized that earlier fertility reductions would be evident in Magsaysay than in Matanao due to its greater progressiveness and comparatively greater opportunities to better its economic circumstances.

The surveys included a sample of 2,050 households divided between the two communities. Interviews incorporated both economic and demographic variables, and covered all household members. The author, an anthropologist, also retained continuous contact with the region over the ten year period, giving his analysis the richness and intensity of an in-depth micro-study. The data were analyzed mainly by cross-tabulations.

Over the decade, three important government programs were introduced which seemed to make the hypothesized fertility differences between the two communities even more likely. These included land reform for rice and corn farmers, limiting their

holdings to seven acres, crop production loans to rice producers and a nation-wide family planning program. Whereas for the rice producers, the loss of land was compensated for by the increased yields made possible by Green Revolution technology, there were no offsetting benefits for corn producers; similarly, crop production loans were not available to corn growers. Hence, it was hypothesized that these program interventions "would serve to hasten the differentiation of Magsaysay and Matanao along the lines predicted." (Hackenberg, 1984:9)

The results of the research were quite surprising, especially the changes produced in cropping patterns, levels of living and fertility. They are summarized, albeit too briefly, as follows:

- (1) the effects of land reform were more pronounced in Matanao, the "control" area, because farmers made major shifts to other cash crops, whereas Magsaysay producers retained their previous cropping patterns;
- (2) the proportion of tenants and leaseholders decreased as a result of land reform in both communities, while that of labourers increased markedly. The latter organized themselves into contract labour gangs or shifted to share and wage arrangements;

- (3) income distribution improved in both communities due to production increases from the high-yielding varieties and substantial gains in employment opportunities for both men and women;
- (4) with the increasing specialization of adult manpower, child labour declined; in fact, children of farm labourers did the least productive work, and those of high income families did the most;
- (5) out-migration was experienced in both areas, mainly of 20-29 year olds in search of urban jobs, especially from the highest income households;
- (6) fertility fell dramatically in both communities, but the decline was greater in Magsaysay than in Matanao. In the former, total fertility rates for all women dropped from 7.5 to 3.3; in the latter, from 7.5 to 4.1;
- (7) the use of effective contraception was higher in the study areas than elsewhere in the Philippines; and,
- (8) educational levels increased in both areas, especially among females, and this was accompanied by a "breathtaking shift downward" in marriage rates.

**EVALUATION OF METHODOLOGICAL APPROACHES IN TERMS
OF INSIGHTS GAINED**

The Thai study sought to obtain generalizable results by selecting a very large sample, representing different districts and types of reforestation and non-program village. Hence, over 5,300 households were interviewed. As a result, some very interesting findings emerged regarding the relationships between residence and work in a reforestation village and fertility and child mortality, providing challenging hypotheses for further investigation.

On the other hand, many questions were left unanswered by the Thai project which could be investigated more appropriately by a smaller scale and more intensive study, involving longer residence in the communities, observation of daily life and closer acquaintance with the villagers. For example, the surprising finding that child morbidity and malnutrition were higher in the reforestation communities than in the other villages is not explained in any depth. We have the impression that this may be due to the relatively short length of time the villages have been in existence and therefore to the lack of a supportive community infrastructure, both physical and social. However, it may also be that the residents of reforestation villages have different characteristics than those of the more settled communities, and perhaps adopt different behaviour with

regard to, for example, feeding practices and child-care. It could also be that the higher employment levels of women in the program villages interfere with their ability to look after their children adequately. None of these hypotheses was investigated in the Thai survey.

Another interesting finding of the study which deserves more attention is the somewhat contradictory picture of the program's impact upon fertility. What are the reasons that, in the Northern region, fertility was higher among older women in the reforestation areas, but lower among younger females? Why was overall fertility higher in the program villages of the Northeastern region? Only a brief and hypothetical explanation was given by the research team, presumably because their data did not allow them to reach any firm conclusions about these relationships. The hypothesis was provided that the relative poverty of the reforestation villages could have been responsible for this higher fertility, but this was not developed or investigated in any detail.

Generally, also, the Thai study leaves open the question of the nature and extent of interaction between the reforestation program and demographic behaviour: evidently, the economic effects were positive but the demographic effects were much less straightforward. In the case of child mortality and morbidity, in fact, the reforestation program seemed to be having a clearly adverse impact.

The Bangladesh study employed both quantitative and qualitative methods to examine the impact of the Comilla Program on a selected village. As such, it was able to illustrate that the program was creating better living standards and educational and other opportunities than were found elsewhere in Bangladesh. Because of the author's familiarity with the village residents, case studies were provided, which allowed us to understand, to some extent at least, the reasoning of local farmers concerning, for example, child-bearing and the economic value of children. Although the present paper could not provide a detailed reiteration of the Khuda study, the author does give explanations of how development activities have led to the eventual lowering of fertility through the transformation of traditional ideals and the adoption of family planning, which was readily available in Sreebollobpur.

On the basis of this study one can reach tentative conclusions about the impact of the Comilla Program. However, in order to be more confident about the reliability of such observations, a larger sample would be required, along with a more scientific research design. The latter could either take the form of a longitudinal study, in which a baseline survey is conducted at the inception of the development program and changes are observed over time, or of an experimental design, in which a control area is selected as a point of comparison with the intervention area. Since neither of these approaches was adopted, the author was forced to compare his findings with averages for the nation as a

whole and with results from other studies, all of which were conducted at times different from those of his own survey. Although such comparisons allow one to conclude that the development interventions are having a positive impact, one cannot say exactly how much of the change is due to the program, and how much would have occurred without it, as a result of overall modernization tendencies or other changes in the society.

The Philippine study utilized a combination of a longitudinal design and an experimental approach, in which one community was taken as a control area. It also combined quantitative surveys of a relatively large population with micro-level observation over a ten-year period. This mix of methods not only yielded reliable quantitative data on the economic and demographic changes resulting from the Green Revolution and the family planning program in the two communities, but also provided the basis for understanding larger contextual influences and for interpreting unexpected findings. This study therefore presented a broader and more coherent portrait of regional development and its consequences than the other two projects.

Some examples may serve to illustrate this point. Hackenberg was concerned not only with economic and demographic adjustments but also with a more theoretical understanding of the meaning of development, and behavioural responses thereto, at the

regional level. Thus, much of his paper dealt with the adequacy of various theoretical interpretations of these adjustments, including "polarization" and "stratification". However, his micro-level trend analysis led him to conclude that "diversification" is a more accurate description of rural dynamics in Mindanao society. Peasants reacted in a number of innovative ways to changing circumstances and opportunities. For instance, tenants willingly gave up their land in order to take up other, more profitable, contract and wage arrangements. Thus, by seeking evidence for various broad theoretical perspectives at the micro-level, Hackenberg derives a more meaningful framework for the entire analysis, that of diversification, than would have been possible through the adoption of existing interpretations of regional patterns.

Micro-level experience also provided important information for the understanding of unexpected results of the longitudinal study. For example, the hypothesized fertility differentials between the two study areas did not emerge: in fact, fertility fell almost as much in the control area than in the experimental community. On the basis of survey data alone, the author would have been hard pressed to explain this finding. However, due to his continual contact with the area over the decade, he was able to enumerate the series of events which intervened. As we have seen, economic adjustments to development incentives and family planning initiatives were even more pronounced in the

control area than in the more developed community, due to the refusal of local farmers to stagnate under traditional productive arrangements. Lower fertility was simply another adjustment to changing economic and social circumstances and opportunities.

Thus, it may be argued that the Hackenberg study utilizes an ideal combination of methodological tools for determining the impact of development interventions upon demographic behaviour. One feels confident in the explanations provided by the analysis because they are based on various sources of data, including qualitative insights over a considerable period of time. The portrayal of regional contextual factors, including the various government programs introduced into the region over the decade, also makes the conclusions more understandable to local and national decision-makers and hence more amenable to policy implementation.

CONCLUSION

In conclusion, some general observations concerning the impact of development programs upon demographic behaviour may be derived, based on the above studies and on the IDRC experience more generally. Firstly, single theoretical models of economic or demographic responses to development are often inadequate to explain the complexity of rural behaviour in Third World societies. Peasants frequently react in unanticipated ways to

changing circumstances, by making adjustments which they perceive to be to their advantage which may not correspond to the responses anticipated by the development planners. The Philippine case study illustrated the resiliency of farmers to adopt not only to positive structural changes but also to potentially adverse economic conditions. The result, for the majority of residents in the more backward areas, was to turn an apparently worsening situation, landlessness, into one of relative prosperity, through the establishment of new labour arrangements.

A related conclusion emerging from this, and many, other studies funded by IDRC (Aramburu, 1986; Forni and Benencia, 1986; Giraldo Samper, 1986) is that "accidental" or unexpected factors frequently intervene to alter anticipated relationships between development inputs and demographic outcomes. This has already been discussed in some detail with respect to the Hackenberg study, but it was also evident in the Thai reforestation project with respect to the higher mortality and fertility levels in many of the reforestation villages. However, due to the lack of in-depth qualitative information in the latter analysis, we are left with many questions concerning the nature and effects of these intervening variables.

Most studies seem to agree that areas experiencing favourable economic trends, such as the reforestation villages in Thailand, tend to retain their population more than non-program

areas. This indicates that progressive agrarian policies which provide increased employment opportunities in the agricultural sector can have a positive stabilizing effect upon rural areas. While the Hackenberg study may appear to be an exception, in that out-migration was fairly pronounced, this was due primarily to "pull" factors rather than to "push" causes, as it generally involved young adults from high income households, who left in search of greater educational and employment opportunities elsewhere. Although it is true that the local farmers adjusted their economic responses to meet the changing circumstances, they were also realistic in realizing that only a limited number of agricultural workers could be absorbed within the existing framework. They therefore encouraged their children to leave in order to diversify the family's economic base and to relieve population pressure in the rural origins.

Another important finding of the three studies is that fertility declines tend to accompany intensive development and family planning efforts. Although the results for Thailand were less consistent than might have been hoped, it appeared that the participation of women in reforestation jobs led them to reduce their fertility to some degree. In the Philippines and Bangladesh, a combination of favourable social and economic conditions seemed to make birth control a logical course of action for rural families.

A nearly universal finding of development impact studies is the marked importance attached to education by the target populations. It is seen both as a means to alter unfavourable economic circumstances, in that educated children can provide more security for their families than uneducated ones (Bangladesh), and as a way of improving already positive outlooks (Philippines). Education is also clearly related to rising age at marriage for females, lowering fertility ideals and greater attention to health and care of children.

The overriding importance of economic change in determining demographic outcomes has been demonstrated by most of the research supported by IDRC. Economic circumstances affect, to a large extent, the types of social and demographic strategies adopted by rural families to survive and adapt to the modern world. Thus, any research which aims to elucidate the impact of development interventions on the demographic or other behaviour of a society must consider not only the micro-effects at the household level but also the broader economic changes taking place in the larger society, at both local and national levels.

Since many projects on the demographic consequences of development programs have been funded by IDRC over the past several years, and most have now been completed, it is probable that support to this topic will decline in future. However, the lessons learned from these studies, particularly in terms of methodology, can also be applied to other topics. The importance

of combining a number of methods, exemplified by the Hackenberg study, has been demonstrated by this research and has provided a model which is broadly applicable to a great deal of social science research.

In this mix of methods, micro-level analysis plays an important role, for the reasons emphasized in this paper. However, it must be emphasized that micro-level research is a relatively new phenomenon for demographers and that it requires training and sensitivity, just as in other disciplines with which a researcher is unfamiliar. Hence, it should not be assumed that the micro-approach can be undertaken by any given researcher or simply as an "add-on" to other investigations. The various methods should be carefully selected and integrated from the beginning of the research and carried out by qualified and trained investigators.

The observations made in this paper concerning the usefulness of a combination of methods are also relevant to several other areas of research which are of interest to IDRC. Longitudinal studies which employ surveys at two or more points in time, in conjunction with an experimental design and micro-analysis, are applicable to evaluations of the impact of health interventions, such as tropical disease control, or of family planning programs, upon target populations. Studies of the impact of migration on communities of origin, such as those affected by heavy out-migration to urban areas or to other

countries, can also benefit from such an approach. Such a mix of methods allows for the interpretation of complex interrelationships, changes and unanticipated consequences. Whenever possible, then, a combination of methods is recommended, allowing the researcher to take advantage of the positive contributions of each approach, but also to compensate for the inevitable deficiencies in the very nature of the data with which social scientists must work.

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