

## Exploring the links between environmental degradation, poverty, and fertility among rural households: some conceptual issues

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The livelihood of the rural poor in developing countries depends critically on local natural resource-based activities such as crop and livestock production, fishing, hunting, fuel wood and minor forest product collection. Given this dependence, it is natural to ask how these households respond to any perceived degradation of this resource base. Previous studies have documented a number of short term and long term strategies that households adopt in response to environmental stress. These include changes in consumption patterns (e.g. eating food that requires less cooking when fuel wood becomes scarce), changes in production strategies (e.g. growing crops more adaptive to poor soils), migration, etc. One strategy that has generated a fair amount of controversy is regarding the households' fertility decision. The question being asked here is the following. How and to what extent does environmental degradation influence households' desired fertility?

Household's fertility response is controversial on several grounds, both conceptually and methodologically. Here I will just highlight some of the conceptual issues that strike me as important from an economic perspective.

### **I. Some preliminary conceptual issues regarding the economic model of fertility**

***1.1 Who makes the decision regarding number of children: is it the household, the couple, the woman or the society?*** As I will discuss in the rest of this paper, the motivations and incentives for having children differ, often quite significantly among these different decision making units. In the specific context of many African societies, where polygamous marriages are sanctioned by custom, it is fairly common for husbands and wives who belong to the same household to operate separate incomes and bear disproportionate amount of child care (Makinwa-Adebusoye, 1994; Cleaver and Schreiber, 1994). Generally women are expected to feed their own children while husbands bear all other house keeping costs. Thus it seems reasonable to assume that the woman, rather than the household, is the decision-making unit. On the other hand, in the South Asian context, this assumption may be difficult to defend. In addition, social norms, culture and religion also play an important part in explaining observed fertility in almost all societies. This issue is very controversial because as Dasgupta (1995: 349) observes, procreation is an "activity at once so personal and so social."

***1.2 How much control does the woman/household have over its fertility decision?*** Some forms of birth control, such as extended breast-feeding and postpartum female sexual abstinence have been practiced by all societies. Fertility has been observed to be below the maximum possible in all societies (Dasgupta, 1995). However, it is argued that in the context of developing countries in particular, there is a large divergence between desired fertility and actual fertility because of the

unmet need for contraceptives. Given that there are systematic household surveys of desired fertility for several countries it is possible to test this hypothesis. In an interesting study based on these surveys, Pritchett (1994) found that about 90 percent of the differences across countries in actual fertility were explained by desired fertility. This suggests that the argument regarding unmet need for contraceptives in developing countries *alone* cannot explain high fertility rates, although it remains true that the availability and acceptance of family planning practices is likely to be an important determinant of observed fertility.

***I.3) Role of economic incentives in determining desired fertility:*** There is now an enormous amount of evidence that suggests that economic incentives, together with several other non economic factors such as culture, social norms, and religion influence desired fertility. Urbanization, women's education and their participation in labor market have all changed the costs and benefits of having children and this is reflected in a significant decline in fertility rates all over the world. In the economic literature, children are modeled as consumer goods, and also more importantly in the context of developing countries, as producer goods and a form of old-age security. Like other goods, the household purchases, children are also costly. Thus the demand for children is likely to be influenced by the net benefits that they provide to the household, conditional upon other social and cultural factors. An economic model of fertility can be useful - without resorting to cheap economic determinism - because such a model helps to analyze the costs and benefits (both monetary and non-monetary) that the household faces in making its choices.

## **II. How does environmental stress influence desired fertility in an economic model of fertility?**

There are multiple pathways through which environmental stress may influence desired fertility. I enumerate some of them below.

***II.1) Increase in relative productivity of children as resource collectors:*** As explained in the background paper, in several developing countries, children have a comparative advantage relative to adults in resource collection activities (such as fetching fuel wood, water and fodder) and spend a significant amount of their time in these collection activities. As resource scarcity increases, and households have to travel larger distances and spend more time in these collection activities, this may increase the demand for children. However, there are several caveats to this argument that need to be kept in mind:

- i) Resource collection activities (such as water and fuel wood collection) must account for a significant proportion of households' total time and energy allocation in order for this pathway to be significant. In my own research using data collected in 1993 by the South African Integrated Household Survey (SAIHS) we found that that around 80% of the rural households collected water from non-private sources (Aggarwal et al., 2001). The average daily time spent by these households on water collection was about two hours. Data from the same source also showed that around 57% of rural households collected wood and spent close to 10 hours per week in collecting it. Similar studies using data from Pakistan and Nepal (see references in the background paper) have also found that rural households spend significant amount of time in these collection activities. However, this factor may not be as significant in other rural contexts with subsidized public provision of electricity and piped water.

- ii) More children imply more helping hands but they also imply more mouths to feed. Thus, it can be shown that if resource scarcity goes beyond a certain point, the net benefit of children decreases. Thus the relation between resource scarcity and desired fertility is not likely to be positive everywhere.
- iii) Fertility decisions are likely to be influenced by resource scarcity only if this scarcity is perceived to continue over the medium to long term (at least 5 –10 years). Environmental stress which is perceived to be temporary (such as during droughts and famines) is not likely to influence fertility decisions.

**II.2) Children as means of transforming open access resources into household wealth for poor households:** This argument is often given by economists to explain how poverty, fertility decisions and resource degradation may be linked in a context of poorly defined property rights (see also background paper, p.7). However, again there are important exceptions:

- i) This benefit from children only holds for a narrow range of open access resources. In particular, it holds only for resources whose exploitation is intensive in use of labor. Thus, for instance, additional children can help collect fuel wood and fodder from open access forests. However, consider a resource like groundwater, for which property rights are not generally well defined. In my work in semi-arid regions of India, I found that with falling water tables, open dug wells have become dry and borewells have become the norm. Only the relatively well off farmers are able to invest in these borewells which are operated with electricity engines. Thus groundwater extraction is a highly capital intensive operation and the poor have been driven out of this extraction game as water tables have fallen. A similar argument can be made in some fishing contexts where with depletion of the stock, fishermen have to further go further into the ocean and use more sophisticated fishing equipment like trawlers. The benefit from children as fodder collectors also only holds for households that are bale to maintain a reasonable livestock holding. Successive droughts and economic upheaval in many parts of the world have had a large impact on livestock holdings of the poor. Distress sales of livestock during periods of economic decline are commonly observed among the poor.
- ii) Open access resources, by definition, are available to both the rich and the poor households in a community, as well as outsiders. If the resource extracted is highly valuable (such as timber or exotic fish species), it is likely to be over-exploited in an open-access context. Once extraction proceeds beyond a certain point, the resource may have become so degraded that it is no longer economical for the richer households given their marginal valuation of time. However, for the poor households, with their lower marginal product of labor, it may still be worth exploiting. Children, who have lower marginal product of labor than adults, may be more suitable for this work. However, one must keep in mind that this kind of resource extraction activity has very low productivity and one might question

whether it adds significantly to household wealth to justify the cost of an additional child.

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