

DISPROVING THE CONVENTIONAL WISDOM

Both Poor and Rich Depend on Natural Resources in Indian Villages

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In the face of growing fears that the Indian computer software industry is stealing American jobs, it is often forgotten that India is still a predominantly agrarian economy. According to India's 2001 census, more than 70 percent of the population lives in rural areas, and mostly in conditions of desperate poverty. The economy of these poor, rural households is intimately connected to the village natural resource base—its forests, grazing lands, and water resources. Whether households are able to make a living from agricultural income depends, in large part, on the amount of water available for irrigation. Similarly, the availability of fodder on village grazing lands affects the income that households derive from livestock rearing.

Given then the dual existence of high levels of poverty and dependence on local common resources, the question arises as to whether improved natural resources management can form the basis of poverty alleviation policies in rural India. Working with my colleagues, Shreekanth Gupta of Delhi University and Klaas van 't Veld of the University of Wyoming, we have set out to explore this and other dimensions of the relationship between poverty and the environment in rural India. Our focus—Madhya Pradesh—is the largest Indian state in size and is located in the center of the country. Its capital is Bhopal. We began our research by collecting household and village-level data from a random sample of households. We supplemented the data with remote-sensing information on forest and fodder biomass to construct a comprehensive data set that combines information on household income with information on the local natural resource base.

A key finding of our research contradicts conventional wisdom: dependence on natural resources does not decline with rising income, where dependence is defined as the share of

total income that households derive from natural resources. Instead, dependence follows a U-shaped relationship with income, that is, dependence on natural resources first decreases and then increases with income.

OUR FIELDWORK

We carried out our field research from June 2000 to May 2001 in the Jhabua district, a hilly region located in the western part of Madhya Pradesh. More than 50 percent of its total land area is classified as agricultural land, 20 percent as forestland, and the rest as land not available for cultivation. Jhabua is one of the poorest districts in the state, and about 30 percent of the district's rural population lives below the poverty line. Agriculture, predominantly rain-fed, is the main occupation. Households often supplement their income through livestock rearing and through the collection of various forest products—construction wood, fuel wood, Tendu (*Diospyros melonoxylon* Roxb.) leaves, and Mahua (*Madhuca indica*) flowers and seeds.

Data for the study were collected through surveys from 550 randomly selected households spread across 60 villages in Jhabua, covering the period from June 2000 to May 2001. In doing so, we also tried to fill an important gap in the economic development literature: most studies that look at the relationship between poverty and the environment are based on a few carefully selected villages.

The Madhya Pradesh Groundwater Department has monitored the groundwater level since 1973 in all 89 villages from which we drew our sample of 60. A list of households, in turn, was constructed for each sample village from land ownership records and from the Madhya Pradesh government's list of



households living in poverty. Finally, we relied on remote-sensing images to obtain village-level measures of forest and fodder biomass.

DIFFERENT COMPONENTS OF HOUSEHOLD INCOME

To determine the extent to which households in rural Jhabua depend on common natural resources, we calculated what we call the “current income” that each household derived over a year from seven major sources: agriculture, livestock rearing, common-property resource collection, household enterprise, wage employment, financial transactions, and transfers from relatives and the state government. Income from each of these sources was calculated as the difference between total revenue obtained and total costs incurred.

Common-property income, in turn, was comprised of income from the main resources collected from village commons: wood for fuel, wood for construction, fodder, Mahua flowers used to make local liquor, Mahua seeds used to make cooking oil, Tendu leaves used to make local cigarettes, and animal dung used as agricultural manure and cooking fuel.

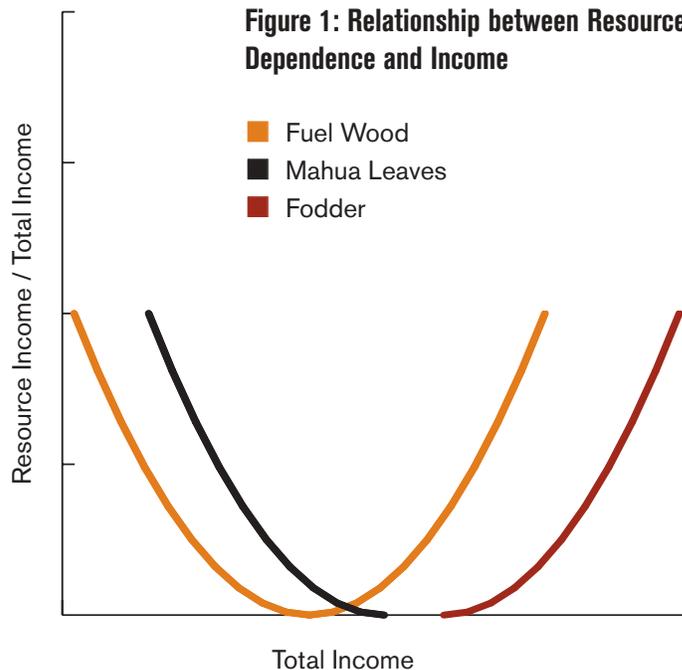
Once income from the different sources was calculated, we made these numbers comparable across households by dividing the income obtained by the number of adults in the household.

CURRENT AND PERMANENT INCOME

During our survey year, a large disparity existed between the current per-capita income of households in the bottom three quartiles and that of households in the top quartile. (A quartile, in this case, refers to where a household falls along the entire income distribution.) Households in the lowest quartile, on average, lost 2,024 rupees over the course of the survey year, while the average household in the top quartile earned 10,383 rupees. The large losses in agriculture and livestock rearing are explained by the fact that the survey year was the fifth consecutive drought year in Jhabua.

Surprisingly, households in the bottom quartile were by no means asset-poor. They cultivated as much land per capita as households in the top quartile, and more than households in the second and the third income quartiles. The per-capita value of land owned by these households was also considerably above that of households in the middle quartiles, though below that of households in the top quartile. Similarly, households in the bottom quartile had more farm capital and livestock than households in the top three quartiles.

Figure 1: Relationship between Resource Dependence and Income



All else being equal, households rich in private assets should be considered less dependent on common resources, because their assets serve as a buffer to sudden income losses. A household that owns gold jewelry has the option to sell or mortgage it to make up for losses it may have incurred in agriculture. A household without assets, on the other hand, may have no other option but to rely on the local forest and sell firewood, for example, if its income suddenly falls. There is, in fact, evidence that households in the bottom quartile engage in such buffering. These households typically took on new debt and sold jewelry over the course of the survey year to make up for their income losses.

To account for this difference in buffering capability that stems from differences in private asset holdings, we define what we call the household’s “permanent income,” income that households can expect to derive from their asset holdings over the long run.

SOME PERMANENT INCOME STATISTICS

In permanent income terms, as opposed to current income, households in the lowest quartile earned 2,420 rupees per capita while households in the top quartile earned 16,275 rupees. After income from agriculture, income from wage employment was the largest source of income for the households in all four quartiles. However, for the first three quartiles, the wage income mostly came from off-village casual employment. Households in these quartiles earned about

70 percent of their total wage income from such seasonal migration. In contrast, households in the top quartile earned only 29 percent from migratory labor, and 64 percent from regular jobs in the private or public sector.

The main source of transfer income for households in all four quartiles was the state; examples include subsidies to deepen wells and for school meals. Households in the top quartile, despite the fact that such government transfers are meant for the poorest of the poor, received substantially higher transfer incomes than household in the bottom three quartiles.

INCOME FROM THE COMMONS

Despite a widely held belief to the contrary, dependence on common natural resources does not decrease as incomes rise, our study shows. Instead, dependence follows a U-shaped relationship with rising income, declining at first but then increasing. Among the households that collected natural resources (400 households in all, dispersed across all 60 villages in the sample), the poorest derived about 12 percent of their total income from resources. Dependence decreased to 9 percent for households in the second income quartile, and then increased again to 11 percent for the third income quartile and to 13 percent for households in the fourth quartile. In short, wealthier households depended on the commons as much as the poorest ones.

This relationship is explained by a combination of trends in dependence on individual resources (see Figure 1). While increasing use of construction wood and fodder account for the increase in overall dependence at higher incomes, decreasing use of other resources (Mahua flowers and seeds, Tendu leaves, gum and dung) accounts for the decrease in overall dependence at lower incomes. The latter trend is best explained by the fact that collection of these resources is a low-return activity, and one that the rich move away from as more productive uses for their labor become available. With regard to fuel wood, dependence first decreases and then increases, suggesting that all households in the village, whether they own private trees or live near a fuel wood market, prefer to gather fuel wood from the commons.

The rich depend heavily on fodder collection because they have larger animal holdings and therefore a greater demand. Similarly, the high dependence of the rich on construction wood is driven by their higher consumption demand, both for larger houses that they can afford to build and also from larger land holdings and, therefore, larger demands for wood for agricultural implements, such as plows.

So far, we have only described income from resources that

are directly collected by households—that is, by hand. Households also gather one resource, fodder, indirectly by letting their animals graze in common grazing lands. Unfortunately, we have no reliable way of converting time spent grazing to a monetary value. We instead consider time spent grazing one's animals as a proxy for grazing income. As with fodder collection, time spent grazing increases with higher incomes, again for the simple reason that it is the rich who have larger animal holdings.

Also, largely due to the difficulties of pricing water, we have been unable to consider how dependence on water changes with household incomes. Given that one of the main uses of water is irrigation, however, we would expect land to act as a complement to common water resources, which would tend to further increase the overall resource dependence of the rich.

CONCLUSION

Previous studies have found that resource dependence strongly decreases with income. But our study finds a more complex relationship—contrary to common wisdom, rich households are just as dependent on natural resources as the poor, though the rich and the poor depend on different resources. This, in turn, implies that households in rural areas do not turn to the environment solely in times of desperation. And rich households, which tend to have a broader set of options to choose from to earn a livelihood, regard the forests and other resources as a profitable source of income.

Our findings have important implications: improving the quality of natural resources will have a lasting impact on reducing poverty. If dependence on resources did decrease with income—the conventional wisdom—then efforts to improve the village natural resource base would help the poorest of the poor immediately. However, as these households made their way out of poverty they would turn to sources of income other than those based on natural resources and would no longer benefit from efforts to improve their environment.

Improvements to the natural resources would, on the other hand, have a lasting impact on poverty if both the poor and the rich are dependent on these resources. Even as household incomes improve, households will continue to draw on natural resources to earn a living. ■

This article is based heavily on Poverty and the Environment: Exploring the Relationship between Household Incomes, Private Assets, and Natural Assets, by Urvashi Narain, Shreekant Gupta, and Klaas van 't Veld. Available at www.rff.org/rff/Documents/RFF-DP-05-18.pdf.