



EDUCATION, NONFARM INCOME, AND FARM INVESTMENT IN LAND-SCARCE WESTERN KENYA

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An engine for agricultural intensification

MOST OF THE WORLD'S POOR live in rural areas, and agricultural development appropriately is the focus of many poverty reduction strategies, especially in Africa, where rural poverty remains especially acute. In places like western Kenya, however, rapid population growth and relatively egalitarian access to land result in farm sizes so small that households cannot climb out of poverty solely through growth in farm productivity. Remunerative nonfarm employment may be necessary for income growth and also for investment in agricultural intensification. Because certain skills—many acquired through secondary or tertiary education—are necessary for such nonfarm employment, investment in children's education and training might help engineer a farm family's long-term escape from poverty while also increasing use of modern inputs that improve soil fertility and crop productivity. The growth of the rural nonfarm sector may therefore be more important than efforts meant to directly increase smallfarmer productivity in economies dominated by tiny farms that may prove uneconomical if farmers fail to intensify.

The BASIS project **Rural Markets, Natural Capital and Dynamic Poverty Traps** studies these relationships. This brief highlights the importance of education and the development of the rural nonfarm economy in a land-scarce region of western Kenya. By revisiting respondents in 89 households (from an original sample of 100) in Madzu Location that first were interviewed in 1989, we have a rare opportunity to examine how household livelihood strategies and welfare evolve over an extended period.

Growing populations, shrinking farms

Madzu, Vihiga District, is fairly typical of western Kenya. It enjoys reasonably fertile soils and a good climate, approximately 1500-1800mm rainfall per year spread over two growing seasons. Infrastructure is rudimentary, limiting access to Kisumu, the region's major city on the shores of Lake Victoria. Population growth rates remain high despite widespread HIV/AIDS, resulting in some of the highest population densities in rural Africa: 1143 persons per square kilometer. Poverty rates are likewise high. In 1997, 53% of Vihiga District's population fell below the rural poverty line (Kenya's national rate was 43.7%).

High population density means that farm sizes that were already quite small when our team first surveyed these households (only one farm was even 2.5 hectares) have shrunk further, from a household mean of 0.5 hectares in 1989 to 0.3 hectares in 2002 (see Table 1). As Figure 1 shows, Madzu farms have been shrinking due to subdivision of family plots among grown children, with the relatively larger 1989 holdings particularly heavily subdivided by 2002. Poverty and small (and shrinking) landholdings go hand-in-hand in this setting.

This raises some key questions. Is there a minimum farm size below which rural households cannot effectively undertake high-return, intensified production involving commercial crops such as tea or improved dairy cattle production? Are farm sizes too small for most rural households to be able to generate agricultural incomes sufficient for avoiding poverty?

At current levels of land availability and with the inexorable population increases, even intensified farm produc-

tion may offer only a modest foundation for secure livelihoods. Moreover, it is unclear whether the funds necessary to invest in agricultural intensification can be generated through farming. While our findings are preliminary, a few key relationships are emerging and seem to offer clues to rural poverty reduction and sustainable agricultural intensification in places such as Madzu.

Table 1. Changes in wealth/welfare indicators, 1989-2002

Welfare indicator	1989	2002
Mean total landholdings cultivated (hectares)	0.5	0.3
Household members with skilled employment (%)	4	5
Household members who completed secondary education (%)	18	16
Primary school enrollment (%)	NA	93
Secondary school enrollment (%)	21	25

NA=not available

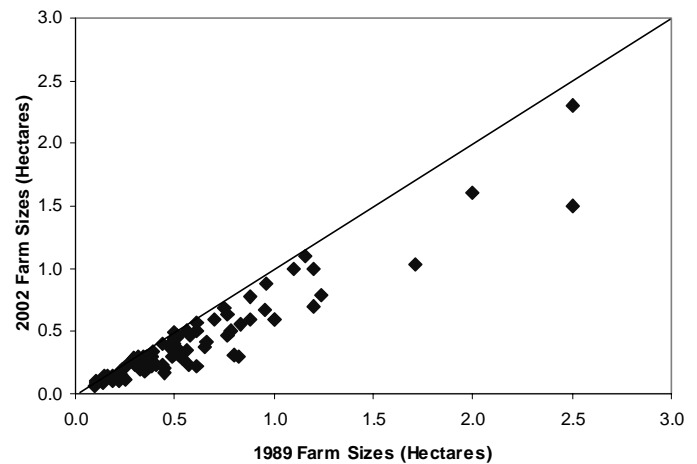
A tale of two farmers

The stories of two successful Madzu farmers illuminate what appears to have been the most effective mechanism for overcoming poverty. In 1989, one farmer was a primary school teacher who then rose through the ranks to become head teacher before retiring. He has eight sons, all of whom he managed to educate through the secondary level and beyond on his teacher's salary at a time when school fees were low. Now, all his sons hold good jobs. One is a doctor, another works as a government marketing officer, a third is a teacher, another is a court clerk, one is an employee of the government fisheries department, and one is a secondary schools auditor. His children remitted enough money home that the father was able to purchase a dairy cow and invest in 800 tea bushes (which yield no marketable produce for three years). He now enjoys a steady stream of fresh milk and cash from dairy sales as well as a lucrative growing contract with the Kenya Tea Development Agency, which supplies him with specially formulated mineral fertilizers and extension services that boost his yields and improve the quality of the tea leaves he sells. This farmer's investment in his children's education provided both a safety net and investible funds for him to make a successful transition to high-value farming after his retirement from teaching.

In 1989, another Madzu resident lived in a small, mud-walled home and worked as a mason/carpenter. Since 1992 he has held a respected civil service job as a

Location Chief. The regular cash income associated with his new position permitted him to acquire a herd of three dairy cows, the manure from which he applies to his napier (fodder) plot, and to purchase and apply mineral fertilizers (DAP and urea) to his maize plot. He now has a spacious five bedroom house and enjoys higher-than-average farm productivity for this community. Reliable nonfarm income paved the way for these two farmers to invest in education, livestock, and soil nutrients that enable them to enjoy a stable livelihood and to make the most of their small farms.

Figure 1. Shrinking farm sizes in Madzu, 1989-2002



Education and farm investments

The key causal linkage between productive asset ownership and stable, relatively high incomes in Madzu appears to run as follows: attaining an above-average education leads to the ability to find formal wage or salaried nonfarm employment, which in turn leads to investment in dairy cattle and tea bushes, upgraded housing, and increased use of mineral fertilizers and organic soil inputs such as manure and improved, nitrogen-fixing fallows. This is consistent with considerable recent evidence from across rural Africa that nonfarm employment is typically positively correlated with income and wealth (in the form of land and livestock), and thus seems to offer a pathway out of poverty if nonfarm opportunities can be seized. Yet this key finding also shows an inherent problem faced by the poor. The positive wealth-nonfarm correlation (especially the longitudinal data that show that higher nonfarm income diversification leads to more rapid, subsequent growth in income and consumption) may suggest that those who begin poor in land, education, and capital face great difficulty overcoming entry barriers and steep investment requirements in order to participate in those nonfarm activities capable of lifting them from poverty.

Further, a positive correlation between educational attainment, nonfarm employment and agricultural productivity suggests that the steady cash flow provided by salaried employment facilitates on-farm investment in agricultural intensification. As a consequence, the educated acquire an absolute advantage in both farm and nonfarm productivity.

The successful farmers described earlier benefited from low-cost public education. A good education enabled them to access more lucrative labor markets in the formal nonfarm rural economy, the proceeds from which they reinvested into their children and their farms. Yet since 1989, government subsidization of public education has been reduced, which caused a tenfold increase in school fees at the local District secondary schools, from an average of KSh3000 per year in 1989 to 30,000 per year in 2002 (equivalent to US\$384 today, an eightfold increase in dollar terms in 13 years). This does not include the increased share of other educational costs (books, uniforms, etc.) borne by students' families today. At more than 250% of the average annual income of households in the poorest quartile, secondary schooling has been effectively priced beyond the reach of the rural poor.

Moreover, although education may be key to good rural nonfarm employment and a stable, secure livelihood, it is an investment that pays only after some time passes. In the era of subsidized secondary education, children's education for both the children's and the parents' subsequent benefit was one of the few affordable investments available to poor rural households. Today this is no longer an attractive option given the short-term sacrifices it would demand of parents in poor households even if they could come up with the necessary funds.

Government budget cutbacks also have reduced the demand for skilled public sector laborers. In spite of reduced demand for skilled labor and sharply higher school fees, secondary school enrollment rates among age-eligible children have risen slightly from 1989 to 2002, reflecting both the cultural importance placed on education and the increasing recognition that education can be necessary to escaping poverty. Unfortunately, median secondary school enrollment rates among age-eligible children increased only from 21% to 25% over those 13 years (see Table 1). This pattern underscores that while demand for it has grown, education has become an increasingly exclusive process.

Educational attainment and resulting incomes have an effect on farming patterns as well. In Madzu, the rate of nitrogen application per hectare in those households

whose head has a secondary education is nearly five times that of those households whose head had only mid-primary school education (see Table 2). Secondary school graduates not only earn mean wages four times higher than those who have not completed primary school, they also enjoy double the maize yields and are more likely to practice the two most remunerative commercial agricultural activities in the region: improved dairy cattle and tea cultivation. This does not seem to be attributable wholly, or even primarily, to improved farm management due to educational attainment. Rather, education is a necessary condition to finding remunerative nonfarm employment that generates regular cash income necessary to undertake farm investments. Education serves to facilitate not only diversification into remunerative nonfarm employment, which could be misinterpreted as prompting exit from farming, but also reinvestment in agricultural intensification through the use of improved inputs to raise productivity. Due to factor market failures, those who cannot self-finance through such means as salaried nonfarm employment cannot put their agricultural land and labor resources to their full productive use, thereby trapping them in poverty.

Table 2. Farm investments by educational level of household head

Education level of household head	Nitrogen application rate (kg/ha)	% households with improved dairy stock	Maize yields (kg/hectare)	Mean daily wages (US\$)	% cultivating tea
Did not complete primary	4	13	1142	0.64	0.0
Completed primary	11	3	1567	0.90	1.6
Completed secondary	19	40	2328	2.56	17.6

The policy challenge

Only one-sixth of the population has completed secondary school (see Table 1), and secondary (or tertiary) education is increasingly unaffordable for the poor. This presents a challenge to policy, since it means that more than 80% of the population cannot be readily absorbed into remunerative nonfarm employment and, under present policies, has little prospect of securing such work or even of equipping their children to compete for good jobs in the future. Since the local economy lacks a significant large farm sector that might generate much full-time agricultural employment, unskilled labor is the chief option beyond cultivating one's own farm. Farming remains the primary livelihood for most rural households; however, with farm sizes averaging 0.3 hectares, cultiva-



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tion of one's own land can hardly absorb all employable household labor. Nonetheless, 64% of all household heads in the 2002 resurvey spend most of their time on their farm.

Meager cash incomes, however, limit most smallfarmers' capacity to purchase inputs or livestock that might enable them to invest in their soils and thereby improve labor productivity and household incomes. Such investments are still greatly lacking. For instance, fertilizer use in this region is currently estimated at less than 15kg of nitrogen per hectare against a recommended level of 50kg. In an area already suffering high rates of degradation from continuous cultivation and limited replenishment of depleted soil nutrients, failure to invest in natural capital has been shown to lead to nutrient mining, erosion, and productivity declines. Because of factor market failures, those who cannot afford to complete enough schooling to access remunerative nonfarm employment tend to be caught in a trap of low productivity, semi-subsistence cultivation, unskilled off-farm labor, and continuous poverty.

Reducing rural poverty in places like Madzu thus revolves around stimulating increased school completion, creating remunerative employment that makes use of educated rural folk, and increasing smallholder farm productivity. Presently, the best jobs available are primary school teaching and clerical jobs in local county authorities and government departments. Unfortunately, these employers currently are laying off much of their staff. Private sector opportunities are even more limited, with the most common being taxi van (*matatu*) drivers. Better-educated people tend to be migrating from the area.

Conclusion

In land-scarce settings such as much of western Kenya, the path to agricultural intensification and conservation of soils and other forms of natural capital may, somewhat paradoxically, begin with the education and nonfarm employment necessary to generate investible resources in communities lacking broadly accessible financial services. Other commentators have similarly observed

“deagrarianization” and commented on the importance of education and rural labor markets in Africa, where the future of rural inhabitants and even of agricultural development appears to depend increasingly on the rural nonfarm economy. First and foremost, this will depend on making formal education more broadly accessible once again and on innovative methods for improving marketable skills among rural populations.



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