



The Response of Income Diversification to Macro and Micro Policy Shocks in Côte d'Ivoire and Kenya

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September 2000

Comments welcomed

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Abstract: This paper presents evidence on the effects of two different sorts of policy shocks on observed income diversification patterns in rural Côte d'Ivoire and Kenya. Data from Côte d'Ivoire show that massive currency devaluation reduced farmer income diversification by inducing a reallocation of effort toward the production of tradable agricultural commodities. But households with poor endowments were less able to respond to attractive emerging on-farm and non-farm opportunities. Due to entry barriers to superior livelihood strategies, the benefits of exchange rate reform accrued disproportionately to households that were richer prior to devaluation. Food-for-work transfers to households in semi-arid Kenya appear to have significantly reduced the liquidity constraints faced by project participants, enabling them to pursue more lucrative livelihood strategies in non-farm activities and higher-return agricultural production patterns. FFW had no discernible effect on income diversification because the agroecology necessitates considerable diversification whether or not one participates in the food-for-work project.

1. Introduction

Most African smallholders derive some income from activities outside primary agriculture (“non-farm” activities), away from their own farms (“off-farm” activities), or both (Reardon 1997, Ellis 1998, Bryceson 1999, Barrett and Reardon 2000, Ellis forthcoming). Much attention has been paid to the role of non-farm livelihoods in coping with natural and policy shocks (Reardon et al. 1992, Reardon and Taylor 1996, Ellis 1998). Yet remarkably little is known about the reverse causality: how policy shocks affect African smallholders’ livelihood diversification patterns. Policy is rarely designed with smallholder diversification behaviors in mind, so any effects are likely unintended. But if diversification provides an important means by which smallholders self-insure against risk or accumulate capital for investment – be it in human (e.g., children’s education or health), physical (e.g., farm machinery), or natural (e.g., windbreaks or terracing) form – then the effects of policy on diversification patterns surely matter to smallholder welfare and merit investigation.

This paper explores this question using both longitudinal data related to a macro policy shock, devaluation of the currency in Côte d’Ivoire, and cross-sectional data related to a local policy shock, the distribution of food aid to farmers in Baringo District, Kenya. By comparing across two different types of data sets and of policy shocks, we hope to begin to identify generalizable patterns of response. These are, of course, but two samples and there is effectively no preexisting literature on which this paper can build. So it would be imprudent to leap to conclusions on the basis of this analysis alone. Nonetheless, as the following sections demonstrate, it appears that ex ante endowments and liquidity constrain smallholder activity choice, restricting access among some populations to relatively more lucrative livelihood

strategies. Those whose meager asset endowments leave them liquidity constrained and induce them to hire out their labor to other farmers are in general unable to take advantage of emerging opportunities in the non-farm sector unless specific policy interventions – potentially including the provision of transfers such as food aid – relieve their working capital constraint at the margin, permitting investment in new or expanded non-farm activities.

2. Concepts and Definitions

The burgeoning literature on *livelihood strategies* and *diversification patterns*¹ includes many different implicit definitions for terms such as “non-farm” and “off-farm.” The farm/non-farm distinction revolves around sectoral classifications derived from standard national accounting practices while the on-farm/off-farm distinction reflects the spatial distribution of activities, with “off-farm” income generated away from one’s own land (Barrett and Reardon 2000).² But not all non-farm or off-farm activities offer equal returns. Economic theory clearly predicts that returns to an activity are increasing in the difficulty of entry into or exit from that market niche. Activities unfettered by entry or exit barriers, such as unskilled farm labor, offer low returns while those

¹ We use these two terms interchangeably.

² More precisely, “farm” activities are associated with those primary sector production processes that produce **raw** agrifood products from natural resources (land, rivers/lakes/ocean, air). The process can involve either growing (e.g., cropping, aquiculture, livestock husbandry, woodlot production) or gathering (e.g., hunting, fishing, forestry). “Nonfarm” activities are associated with those secondary and tertiary sector production processes that use raw physical intermediate inputs (such as maize, milk, iron, wood) and process them into manufactured goods (such as maize flour, cheese, pails, furniture) or use financial or manufactured capital and labor to produce services (e.g., transport, commerce, banking). Notice that sectoral assignments depend only on the nature of the product and the types of factors used in the production process. Neither location (at or away from home) nor employer (self-employed or hired for a salary or wage) matter.

with significant entry barriers – e.g., the acquisition of skills or equipment – yield positive marginal economic profits. Previous empirical research in rural Africa has established the existence significant entry or expansion barriers to high return niches in the nonfarm economy (Reardon et al. 1992, Fafchamps 1994, Barrett 1997, Reardon 1997, Reardon et al. 1998, 2000).

African smallholders allocate their assets across on-farm, off-farm, and non-farm activities so as to design livelihood strategies that achieve something at least close to an optimal balance between expected returns and risk exposure conditional on the constraints they face (e.g., due to missing or incomplete markets for credit, labor, or land). Following the principle of revealed preference, observed diversification patterns thereby provide important indirect evidence as to what people presently consider their most attractive options, given the constraints they face. So studying how policy shocks affect diversification patterns provides a means of ascertaining how, if at all, policy changes smallholders' opportunity set. The effects of policy on diversification behaviors are thus a sort of economic allegory for the effects of policy on the broader incentives and constraints facing rural African households.

Barrett et al. (2000) identify four distinct rural livelihoods strategies offering differing returns distributions. Some rural African households depend entirely on primary agricultural production for income, either entirely from own animal and crop production on-farm,³ what we term the “on-farm only” (OFO) strategy, or by combining own production on-farm with wage labor on others' farm, which we refer to as the “on- and off-farm only” (OOFO) strategy. The last two strategies combine farm and non-farm earnings. Within this population, we draw a

³ On-farm production may include food crops, cash crops or livestock, and output may be sold to market, retained for home consumption, or both.

distinction between those who undertake unskilled labor – whether in the farm or nonfarm sectors – and those who do not. The “mixed-with-skilled-employment only”(MSO) strategy does not include unskilled labor and tends to be associated with higher income households with relatively better educated or skilled adult members. The fourth “mixed” strategy combines all three basic elements discussed so far: on-farm agricultural production, unskilled on-farm or off-farm wage employment, and nonfarm earnings from trades, commerce and skilled (often salaried) employment.

These four, basic household livelihood diversification strategies do not offer similar returns. The strategies that include nonfarm income stochastically dominate those based entirely on agriculture, while the MSO and OFO strategies generally offer superior returns to the mixed and, especially, the OOFO strategies, respectively (Barrett et al. 2000). These differences arise due to variation in the degree to which each strategy involves barriers to entry.

Pursuit of the OFO strategy requires reasonable access to land for cultivation and grazing. Markets for both rental and sale of land are thin in each of the surveyed areas, so land allocations are typically subject to binding constraints⁴ based on households’ exogenous land endowments. If a household has sufficient land to absorb its whole working age labor force, the OFO strategy may appeal if the household is in a high potential agroecology with satisfactory market access or if non-farm opportunities are too expensive to pursue. In comparative work across different African agroecologies, Barrett et al. (2000) find the proportion of smallholder households choosing the OFO strategy is increasing in income as well as in land/labor ratios, reflecting both

⁴ These are akin to liquidity constraints that don’t preclude borrowing, just enforce non-price rationing.

the positive correlation between income and both land endowments and market access. Those pursuing the OFO strategy prove far more likely to engage in cash crop production of tradables than do farmers pursuing the OOFO strategy, which tends to prevail in areas with poorer market access. Smallholders pursuing an OOFO strategy generally have insufficient land, given households labor endowments, to survive entirely off own production.

Entry into the nonfarm sector depends on market access, simply because people must be able to sell their handicrafts, processed farm products, labor for mining or factory work, etc. Within the nonfarm sector, skill, capital or both are required to enter higher-return activities such as long-haul motorized transport, salaried employment, etc. The returns to hard-to-finance equipment and scarce skills are typically much higher than are returns to unskilled labor, so the MSO strategy typically yields higher returns than the mixed strategy does.

As Dercon and Krishnan (1996), Dercon (1998) and Barrett et al. (2000) argue, the most plausible explanation for rural Africans' choice of demonstrably less desirable livelihood strategies is that differences in asset endowments – especially of land, labor, education, and livestock – and access to markets and financing differentially constrain household choice. Moreover, those same constraints may also compel diversification into low-return activities. Poor endowments of productive, non-labor assets such as land or livestock commonly force poorer households to hire themselves out to work others' fields or to herd others' animals for low wages.

3. Diversification Behaviors in Response to Exchange Rate Devaluation in Côte d'Ivoire

We begin the empirical analysis with the case of Côte d'Ivoire. We use the West Africa Rice

Development Association (WARDA)'s farm management and household survey (FMHS) of 120 rice farming households.⁵ These were selected by stratified random sample in three distinct humid-to-sub-humid agro-ecological zones, each with relatively fertile soils, ample water, and reasonably good market access. The Ivorien data thus represent high agricultural potential zones by Sub-Saharan African standards. Rice is the primary cereal in the region, with significant cultivation of tubers, pulses, other cereals and cash crops such as cocoa, coffee and cotton by these households.

The WARDA FMHS collected data for three consecutive years, 1993-95, straddling the January 1994 100 percent devaluation of the CFA franc (FCFA),⁶ which had been fixed at a 50:1 parity against the French franc for the preceding 46 years. While devaluation had been mooted for years, the extent and timing of the event were nonetheless a substantial shock to most residents of the FCFA economies. For some months thereafter, there was considerable uncertainty as to how prices would change and what implications this had for farmers' livelihood strategies. Ultimately, devaluation and contemporaneous macroeconomic policy reforms had the effect of significantly increasing real returns to the production, processing and marketing of tradables, including crops like rice, cocoa, coffee, and cotton as well as many skilled non-farm activities like transport, milling, metal working, garment production and distribution, etc. Devaluation depressed real returns to low-wage non-farm activities such as hair cutting or cleaning and to the production of nontradable primary products like cassava, cowpeas or yams.

⁵ The data and their collection are described in detail in WARDA (1997).

⁶ The FCFA is the common currency of the 14 central and west African nations belonging to the *Communauté Financière Africaine* .

By inducing increased cultivation of rice and other tradable crops, exchange rate devaluation induced a significant reduction in rice farming household income diversification. The mean percent of income derived from off-farm and non-farm activities combined fell in this sample from 19.2 percent in 1993 to just 5.4 percent in 1995. So at the aggregate level, devaluation induced greater specialization, not more diversification. And although returns to rice increased in real terms, average per capita real incomes in this rice farming population fell by 4.3 percent between 1993 and 1995, reflecting largely decreased rice yields and poorer real returns to non-rice crops and wage labor.

Farmers exhibited tremendous mobility among livelihood strategies between 1993 and 1995. Almost two-thirds of households switched strategies between 1993 and 1995 (Table 1), with most of the movement out of non-farm activities and into agricultural production, either as producers or unskilled farm laborers (Table 2). Ivorien farmers are clearly not stuck in a single activity for long in the wake of significant terms of trade shocks, just as Davies (1993) found Malian farmers to be adept at adapting livelihood strategies in response to climatic and other natural shocks.

The aggregate figures nonetheless mask significant differences within the population of rice producing households. Those with relatively poor land endowments and incomes – those two variables are strongly, positively correlated in these data – remained relatively more dependent on agricultural wage labor. The lowest quartile of the 1993 per capita income distribution still derived 11.6 percent of 1995 total income from off-farm agricultural labor, down only from 13.7 percent in 1993. More fundamentally, they were far more likely to wind up pursuing the OOFO strategy than were the upper three quartiles, with more than 70 percent of the poorest households

engaged in unskilled farm labor in addition to production on their own farm. None were engaged in skilled or salaried non-farm activities in 1995. Indeed, relative to the upper three 1993 quartiles, the lowest quartile households were far less likely to receive non-farm income (skilled or unskilled) in 1995 or to be fully engaged in production on their own farm (less than ten percent). While virtually none of the households in the upper three quartiles switched into the OOFO strategy by 1995, half of the lowest 1993 quartile did, mainly (86 percent of the switching cohort) moving from unskilled non-farm labor to unskilled off-farm labor. Expansion in the tradable agricultural sector absorbed more labor, drawing the poor back to farming at the margin.

But increased employment in tradables farm production was associated with falling real wages in the wake of devaluation, so these households suffered real income losses. The ratio of the local rice price to the local unskilled farm wage rate increased 16.8 percent, 1993-95, reflecting a nontrivial real income loss for those who depend significantly on unskilled wage income. As Table 2 shows, those pursuing the OOFO strategy in 1995 suffered mean losses of 24.1 percent of real income, relative to 1993, with more than three-quarters of the 1995 OOFO households suffering real income losses.⁷ Those who stayed involved in non-farm activities, largely unskilled non-farm work, while also earning unskilled farm wages likewise suffered mean real income losses, 1993-95, in excess of twenty percent. Table 2 shows the stark contrast in real income change between these cohorts and those who were able to concentrate entirely in on-farm agricultural production or who combined on-farm with skilled non-farm work. These latter groups enjoyed significant mean real income gains, 8.1 percent for those in the OFO strategy in

⁷ Nominal income figures were adjusted by a simple rural deflator constructed out of the prices of local products and wages. Relative to 1993, prices were 52.24 percent higher in 1995.

1995 and 12.4 percent for those engaged in the MSO strategy. While there was considerable variation in real returns within each strategy, the differences between the means of the OFO and MSO strategies, on the one hand, and the OOFO and Mixed strategies, on the other, are statistically significant at the five percent level. Where the median household engaged in the former activities enjoyed significantly positive real income gains, the median household engaged in the latter ones suffered sharp real income losses.

The poor 1995 returns make it easy to understand why most people pursuing the Mixed strategy moved away from that after 1993 and why few people entered. It is likewise relatively easy to understand why many people entered the high-return OFO strategy between 1993 and 1995. The figures in Table 2 that require some explanation are the low rate of exit from and the high rate of entry into the poor-return OOFO strategy, as well as the low rate of entry into the highest-return MSO strategy. The most plausible story seems to be this. Households with limited land endowments, low educational attainment rates and faced with binding liquidity constraints alternate between unskilled employment non-farm and off-farm, depending on which sector is experiencing greater employment growth. But movement between the OOFO and Mixed strategies and the farm and non-farm sectors does not reflect seizure of emerging income opportunities. These households' limited endowments render them unlikely to climb out of the difficult circumstances in which they find themselves in the absence of significant growth in real wages for unskilled workers, perhaps as a result of rapid growth in labor-intensive sectors.⁸ In particular, poorer households haven't the resources to overcome the skill and capital entry

⁸Dercon (1998) describes a qualitatively similar problem of stochastic dynamic poverty traps in which weak initial endowments make it difficult to accumulate highly productive capital to move into a high-return livelihood strategy, cattle production in the Tanzanian case he studied.

barriers that enable the MSO strategy to yield such high rates of real return.

So the effects of massive exchange rate devaluation on rural agricultural households' income diversification were basically three. First, it induced a significant shift back into agriculture, thereby reducing the income share most households derived from non-farm activities. Second, it induced considerable reallocation of labor and other household assets across activities, as shown by the high inter-strategy mobility figures in Table 1. Third, in spite of this obvious mobility, the real income gains from FCFA devaluation accrued overwhelmingly to those households relatively well endowed with land, educated adults, and liquidity, who were already engaged in or able to switch into production of tradables, i.e., to follow the OFO or MSO strategies. Meanwhile, those with poorer endowments remained stuck in unskilled labor and nontradables' production and on average suffered significant real income losses in the wake of exchange rate devaluation. A macro policy shock like an exchange rate devaluation thus seems to create real income opportunities in the rural economy. But the chronically poor are structurally impeded from seizing these opportunities due to poor endowments and liquidity constraints that restrict their capacity to overcome the bad starting hand they have been dealt. So rural factor market failures appear to create dynamic poverty traps (Barrett and Carter 1999).

4. Food Aid Distribution and Diversification Behaviors in Baringo District, Kenya

The Kenyan data were collected by two of the co-authors in a 1994-96 stratified random sample of 308 farm households in three locations and 10 sublocations of lower Baringo District, an arid-to-semi-arid region populated mainly by agropastoralists disproportionately dependent on

transhumant livestock production given high evapotranspiration rates and mean annual rainfall of only 600-700 millimeters. The main activities for rural Baringo households involve production of small ruminants (primarily goats) and coarse grains: millet, maize and sorghum. So the households in Baringo, Kenya, operate in an agroecology of significantly lower agricultural potential than do the Ivorian households we study. This helps stimulate greater diversification out of complete dependence on agricultural production. Human population densities in the District are moderate, with satisfactory access to large metropolitan areas of the Rift Valley (e.g., Nakuru) and the Central Highlands (e.g., Nairobi). This both fuels a more active market for livestock sold to urban terminal markets down country and opens up a wider range of non-farm options to Baringo households than exist for households in more remote arid and semi-arid lands (Little et al. 2000, Smith et al. forthcoming). The District suffers poverty rates above the national average, and financial intermediation is quite limited, so liquidity constraints tend to bind for many rural households (Bezuneh et al. 1988, Little 1994). Between the high poverty rates and difficult climatic conditions, food aid has played a significant role in the area since the early 1980s.

The farm household survey data used here was carried out in Food For Work (FFW) project areas. The survey sample was selected by stratifying the population according to whether or not they participated in FFW projects during the survey period. Some 40 percent (125 households) of the sample participated in FFW during the survey period.

In the absence of longitudinal data, measuring the impact of FFW on income and hence on diversification requires that we first understand what household income would have been if a participant household had not been participating in FFW projects. Although self-selection into FFW projects is an issue, and could introduce bias into simple comparisons among the groups, we

believe the nonparticipants actually provide a good control group for understanding the impact of FFW on recipient household behaviors. FFW's impact on income, income distribution and diversification is strictly additional if no labor substitution occurs between FFW and other income earning activities (i.e., if FFW simply induces increased labor supply). A previous study in this general area found few if any labor substitution effects (Bezunch and Deaton 1997). We check this using the relative mean income (RMI) technique. The RMI method compares the mean income of each income quartile, excluding income from the treatment, in this case FFW, expressed as a proportion of the mean income of the total sample, across the groups. If the RMI patterns are statistically indistinguishable between the treatment and control groups, then the income from FFW can reasonably be treated as purely additional. As Table 3 shows, FFW participants have nearly identical RMI to non-participants in the lower half of the income distribution when FFW income is excluded, reflecting no apparent labor substitution effects. While the differences in mean RMI in the upper two quartiles are somewhat larger, with participants somewhat wealthier than nonparticipants in this upper range, once one controls for intra-quartile variation, these differences are likewise statistically insignificant at even the ten percent significance level. This result supports our use of non-participants as a control group against which to compare FFW participants so as to establish the effects of food aid receipt on household income and diversification behavior.

In the semi-arid regions of Kenya, households typically accumulate wealth in the form of livestock, and engage in mixed crop-livestock production to generate income and satisfy household subsistence requirements. The imputed value of consumed own crop production represents a large share of income in the lower tail of the income distribution, with its share of

income decreasing sharply as one moves up the income distribution (Tables 4a and 4b). By contrast, income from livestock sales increases sharply as one moves up the income distribution. At lower levels of income, livestock sales are driven largely by liquidity constraints and the seasonal needs to purchase food, or pay school fees or emergency health expenditures, while at upper income levels, livestock sales more commonly represent transactional turnover by large herders-cum-traders (Little 1994).

Low cropping potential regions such as the lower part of Baringo District have relatively weak demand for agricultural wage laborers, so even the poor are unable to depend just on the farming sector. Almost everyone earns at least some income from non-farm work. Within the non-farm sector, unskilled labor yields the largest share of income in poorer households, while trades and commerce yield most of the non-farm income in wealthier households, as reflected in Tables 4a and 4b. Poorer households rely far more heavily on wage income than do richer households. Across all sample households, 27 percent of income in the poorest quartile came from wages, while only 17 percent of the richest quartile's income came from wage labor. By contrast, the poorest quartile earned only 25 percent of income from skilled non-farm activities and livestock sales, two high-return niches protected by significant entry barriers. The richest income quartile earned better than half (58 percent) of its income from those activities.

These patterns echo the patterns reported previously from the Côte d'Ivoire data and found in other studies of income diversification in rural Africa (Reardon 1997, Barrett et al. 2000). The wealthy are able to access higher-return niches in the non-farm sector, increasing their wealth and reinforcing their superior access to strategies offering better returns. Those with weaker endowments ex ante are, by contrast, unable to surmount liquidity barriers to entry into or

expansion of skilled non-farm activities and so remain trapped in lower-return, and sometimes riskier livelihood strategies.

As Tables 4a and 4b show, FFW reduces reliance on livestock sales in the poorest half of the income distribution. Since livestock are high return assets in this region sold mainly to meet liquidity needs (Little 1994), the replacement of income from livestock sales with income from FFW signals that FFW reduces poorer recipient households' need to sell off part of their herd in order to purchase food. Since maintaining a viable herd size is central to wealth accumulation and self-insurance in such arid and semi-arid areas (Little 1994, Dercon 1998, Lybbert et al. 2000), FFW appears to have helped participants avoid stochastic dynamic poverty traps among Baringo households.

In the lower half of the income distribution, FFW also had a modest secondary effect of increasing both non-farm income, especially skilled non-farm income earned from trades and commerce, and crop income. An earlier study in this same region similarly found increased crop income resulting from food aid's relief of farmers' seasonal liquidity constraints, thereby permitting them to substitute higher value millet for maize and to hire in more labor during peak labor demand periods (Bezuneh et al. 1988). Since non-farm income from trades and commerce generally requires working capital with which to purchase inventories or equipment, the increase in this income likewise reflects reduction of liquidity constraints at the margin among FFW participants.

In the upper half of the income distribution, the primary effect of FFW appears to be a sharp increase in livestock sales income. This too likely reflects relaxed liquidity constraints. FFW reduces richer participant households' need to purchase food or dedicate as much labor to

crop agriculture, which offers substantially lower but safer returns than livestock do in this environment. As a result, in the upper income quartile crop production value is lower among participants than non-participants but income earned from livestock sales and commerce is substantially increased, such that the participants' top income quartile earned mean income 37.4 percent higher than that of the non-participants' top income quartile.

FFW participants consistently enjoyed higher income than did their non-participant counterparts, and, with the exception of the second income quartile, the difference significantly exceeds the value of the FFW transfer, indicating additional value added, largely from being able to move into higher-return livelihood strategies associated with improved crop production, increased participation in skilled non-farm activities, and improved management of livestock assets for long-term capital gains. The patterns of income diversification are otherwise relatively similar between FFW participants and non-participants, indicating that the effects of FFW are less in inducing a substitution of labor in one area for work on the FFW project than an increase in labor supply and an increase in the productivity of the already diverse income earning activities households have outside the project.

5. Conclusions

Using data from two very different agroecologies – arid-to-semi-arid north central Kenya and humid-to-subhumid Côte d'Ivoire – and two quite different types of policy shocks – exchange rate devaluation and the provision of transfers through a food-for-work scheme – this paper has highlighted the importance of liquidity constraints and other barriers to entry into more lucrative

livelihood diversification strategies. Policy can address those liquidity constraints directly, as in the case of FFW in Kenya, and thereby permit households to undertake more remunerative diversification strategies. Or policy reforms can ignore those liquidity constraints, as in the Ivorian experience, in which case the poorest households tend not to be able to take advantage of emerging opportunities, especially in skilled non-farm activities, and ex ante patterns of inequality are simply reproduced ex post. In order to take advantage of livelihood strategies offering greater upward income mobility, households must be able to overcome entry barriers defined by skills, contacts and capital access.

Those without skills or enough land to fully absorb the household's labor are stuck in unskilled labor, in both the farm and non-farm sector, and are unlikely to be pulled out by macroeconomic reforms that simply shift labor between sectors, especially if those reforms bring falling real wages. By contrast, interventions that aim explicitly to relieve households' working capital constraints can succeed in expanding their livelihood choice set, enabling them to choose strategies offering superior short- and long-run returns and to avoid the sort of dynamic stochastic poverty traps that otherwise plague much of rural Africa (Barrett and Carter 1999).

As the main source of employment and wage goods, improved agricultural productivity indisputably plays a central role in resolving rural poverty problems in Africa. And facilitating broader access to land likewise can help improve the lot of the poorest. But the evidence presented in this paper – and evident in the broader literature on rural livelihoods – clearly points to the necessity of a vibrant rural nonfarm economy, and to the importance of securing access for all to attractive niches within the nonfarm sector through improved liquidity and market access. If progress is to be made in combating rural African poverty, donors and policymakers must

recognize that rural African households draw heavily on off-farm and non-farm income, and that the most successful commonly draw heavily on such sources. Policy must be tailored to facilitate the poor's access to those non-farm opportunities as well in order to secure their livelihoods.

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Table 1: Livelihood Strategies by 1993 Per Capita Income Quartile

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
% in OOFO in 1995	70.8	29.2	6.7	4.8
% in OFO in 1995	8.3	16.7	26.7	28.6
% with non-farm income in 1995	20.8	54.2	66.7	66.7
% in same strategy in 1993 and 1995	29.2	37.5	20.0	47.6
% entering OOFO by 1995	50.0	8.3	0.0	0.0

Table 2: Real Returns to Alternative Livelihood Strategies

1995 Strategy	Percent mean returns 1995/1993 (std. dev.)[†]	Percent with lower 1995 incomes than 1993	Percent switching to strategy 1993-1995	Percent exiting this strategy since 1993
On-Farm Only (OFO)	8.1 (9.3)	41.3	39.1	36.4
On- and Off-Farm Only (OOFO)	-24.1 (11.3)	77.8	51.9	28.6
On-Farm and Skilled Nonfarm Only (MSO)	12.4 (10.7)	30.0	10.0	52.2
On-Farm, Off-Farm and Non-Farm (Mixed)	-21.6 (9.7)	83.3	16.7	92.1

[†] Returns to the OOFO and Mixed strategies are statistically significantly less than returns to the OFO or MSO strategies at the five percent significance tests by two-way t-tests.

Table 3: Comparison of incomes by quartiles for FFW participants and nonparticipants (excluding the value of food received from FFW)

Quartiles	Participants (n=125)		Non-Participants (n=183)	
	Income (KSh)	RMI	Income (KSh)	RMI
Q1	4,373	.23	4,220	.22
Q2	9,069	.48	9,421	.49
Q3	18,064	.95	15,566	.82
Q4	52,619	2.77	38,967	2.05

The mean income of the total sample is 19,014 ksh.

RMI = relative mean income, the quartile mean income relative to the strata mean income.

Table 4: Mean income per adult equivalent, by source, Kenya shillings
a. FFW participants (n=125)

Income source	1 st quartile	2 nd quartile	3 rd quartile	4 th quartile	Full sample
Farm Income					
Own consumption	2224	3105	5052	6656	4278
Crop sales	11	65	14	2568	679
Livestock sales	805	2873	7401	27235	9719
Off-farm wage labor	203	1077	1275	1036	899
Non-Farm Income					
Unskilled labor	852	1242	2889	4514	2392
Trades/skilled labor/commerce	243	647	1425	7815	2575
Other					
Food-for-work	583	890	653	914	761
Pensions, rent, etc.	36	61	125	2798	771
Total	4956	9959	18834	53533	22079

b. FFW non-participants (n=183)

Income source	1 st quartile	2 nd quartile	3 rd quartile	4 th quartile	Full sample
Farm Income					
Own consumption	1966	3955	4437	8307	4588
Crop sales	1	38	94	1911	456
Livestock sales	1022	2665	5830	14400	4891
Off-farm wage labor	188	549	696	1042	614
Non-Farm Income					
Unskilled labor	819	1486	2522	6928	2959
Trades/skilled labor/commerce	156	654	1618	5329	1842
Other					
Food-for-work	0	0	0	0	0
Pensions, rent, etc.	68	73	370	1051	281
Total	4220	9421	15566	38967	15630