Chronic Poverty in Rural Western Kenya: its identification and implications for agricultural development

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1.   Introduction

Kenya's current Poverty Reduction Strategy Paper (PRSP) perceives poverty as inadequacy of incomes and deprivation of basic needs and rights, and lack of access to productive assets as well as social infrastructure and markets (Republic of Kenya 2001). In money terms, absolute poverty in Kenya is pegged at Kshs. 1,239 per person per month in the rural areas and Kshs. 2,648 per person per month for the urban areas of the country (Republic of Kenya 1997). The 1994 Welfare Monitoring Survey (WMS) therefore categorises the poor in Kenya to include people with large families, those engaged in subsistence farming, and those lacking a source of income (WMS 1994). Nevertheless, people in general and the poor in particular define and experience poverty in diverse ways. In the PRSP workshops, most respondents associated poverty with deprivations including lack of land, unemployment, inability to feed oneself and family, lack of proper housing, poor health and inability to educate children and pay medical bills (Republic of Kenya 2001).

With the emergence of panel data sets in recent years, the attention to the nuances of poverty has increased among researchers. In particular, there is increased concern about the possible differences between the chronically poor and the transient poor and the implications for poverty reduction strategies (e.g. Hulme et al. 2001). One of the key hypothesized differences is that chronic poverty may be related to certain structural factors of households (or communities) requiring a different set of interventions than for addressing the needs of the transient poor.

No matter the definition of poverty, most interventions have focused on raising incomes with some amount of scrutiny being put on what these incomes can purchase (Ikiara 1999; Omosa 2002). In the agricultural sector, poverty reduction strategies have centred on promoting increases in production and productivity and access to markets (Republic of Kenya 2001). However, in spite of being a dominant sector of the Kenyan economy, agriculture still harbours the majority of the poor. The question therefore is to what extent can agriculture provide answers to the rising numbers of poor people in the country?

Following a brief overview of the study sites and data, this paper first attempts to identify and distinguish the chronic poor from transient poor and non-poor rural households (section 4). It proceeds to try and understand the links between household structural

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factors and the incidence of chronic poverty. The implications of chronic poverty on agricultural practices are investigated in section 6. A particular case study of use/adoption of new agroforestry practices for soil fertility management is presented in section 7. Finally, some thoughts on the implications of chronic poverty for agricultural development are discussed in section 8.

2.   Study Sites

The data in this analysis come from households in the western Kenya highland areas of Siaya and Vihiga Districts. Much of western Kenya is considered to have good potential for agriculture, with medium elevation (1,100 – 1,600 meters above sea level), deep, well drained soils, and relatively high rainfall (1,200 – 1,800 millimetres per year) that permits two growing seasons. The history of farming in the area, however, is characterized by low input – low output farming. Recent studies have found that crop productivity is very low (less than 1 ton of maize per hectare per year) and that nutrient balances are seriously in deficit (Stoorvogel and Smaling 1990; Soule and Shepherd 2000).

As a result of the favourable climate, high population densities prevail, reaching over 1,000/km^2 in some of the study villages. The Luhya inhabit Vihiga while the Luo reside in Siaya. The farming system incorporates crops, livestock, and trees. Maize (local varieties) and beans are the most common agricultural enterprises. The food situation was reported as deficient by 89.5% of the households in Siaya and Vihiga, who had to buy food to supplement their own harvest (Wangila et al. 1999). Only 8.9% of the households were food secure from their own production. Average household income for western highland households was only $1,014 and value of crop production a paltry $321 according to a recent study (Argwings-Kodhek et al. 1999). Average labor productivity from agriculture (per year) was about $76 in western Kenya, only one-fourth the level achieved by smallholder farmers in central Kenya, an area with similar farm sizes.

In fact, many of the communities under study are among the poorest in all of Kenya and clearly the poorest among the medium to high potential areas. For example, a recent national study of poverty found Western Province (including Vihiga Districts) to be one of the poorest in the country (Republic of Kenya 1997). It was estimated that 31.5% of households in western Kenya are among the hardcore poor, as opposed to 19.6% for all rural areas. Western Province and Nyanza Province (including Siaya District) also had high incidences of sickness that were twice as high as those reported in Central Kenya.

3.   Research Questions and Methodology

The major areas of investigation in this paper are:

1. How can chronically poor households be distinguished from other groups?
2. Is chronic poverty associated with easily observable structural factors?

3. Do the chronically poor practice different farming methods and do they respond differently to newly introduced technologies than other groups?
4. What are the implications of the above for trying to identify the chronically poor and to reducing rural poverty?

As noted earlier, the basis for evaluating these questions is from a recently collected panel data set from Siaya and Vihiga Districts in the western Kenya highlands. The duration between data collection was only two years, the period ranging from 2000 to 2002. Data were collected at the same time each year, in April / May before harvesting crops from the main growing season in order to better observe differences between household expenditure and consumption.

The original sample of 120 was selected with the intention of including (in a balanced way):

- 60 Luo and 60 Luhya households
- 40 very poor, 40 poor, and 40 less-poor households
- 60 likely adopters of new agroforestry practices, 60 likely non-adopters

The reason for this stratification was to assess the impact of new agroforestry practices.[2] Ethnicity variation was easy to implement, but adoption was difficult to predict as the sample was taken at a stage when the technologies were newly disseminated. As for poverty status, the sampled households were classified based on wealth ranking and rapid poverty/wealth survey assessments. Each household was given a wealth score and the sampling procedure selected 40 from each tercile. As such, our stratified sample may still capture the actual distribution of poverty fairly well.[3] Following a couple of drop out households, re-sampling identification errors, and missing data, this paper includes 103 of these households in the analysis.[4]

Identical surveys were administered in each year. Variables measured included asset stocks on hand at the time of the survey, non-food expenditures for the previous quarter, and food consumption for 2-3 consecutive 24 hour recall periods. Other data included a range of household characteristics, farming practices, and detailed information on use of new agroforestry practices.

Qualitative information is also available for 40 case study households in the same villages (some of the same households in fact). Two sociologists spent a total of 14 person months collecting and analyzing information in the field. Though the qualitative research did not have a "baseline" the case studies provide valuable insights into the issue of chronic poverty and these are also presented here.

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[2] The sample is drawn from a larger dataset of 1,633 households spanning 17 villages. Ethnicity, wealth variables, and early use of agroforestry variables were recorded for all 1,633 households.

[3] Some deviations from reality could have been introduced by the further stratification by likely agroforestry adoption.

[4] Some mismatches occurred because the data were collected in different surveys involving different persons.

4.   Defining and counting the chronic poor

Table 1 displays estimated calculations of chronic poverty for the sampled households using four different yardsticks, intake of energy requirements, intake of protein requirements, non-food expenditures per capita and value of liquid assets. Of these, the use of assets to assess the degree of chronic poverty is unusual compared with other research. Often, assets are used as possible explanatory variables for the patterns of observed chronic poverty and, Carter and May (2001) use assets to further nuance the nature of the chronic poor. We feel it is instructive however, to compare changes in a stock variable against the more commonly used flow variables.

The food and nutrition measures are based on actual intake of food over 3 consecutive 24-hour recall periods prior to the harvest of the long rainy season crop.   The values are calculated at the household level – total food consumed divided by number of consumers (adjusted by age). It may be possible that households may actually be comprised of sufficiently and insufficiently nourished individuals, but the data could not distinguish these cases. Poverty is defined as consuming less than the minimum daily requirements set for by the United States Department of Agriculture. For the expenditure figure, we calculated the per capita non-food expenditure amounts.[5] These were compared to 25% of the 1997 poverty expenditure line (i.e. assuming that 75% of expenditures would be for food) of 1,240 shillings per person per month (adjusted upwards for inflation to reflect the nominal values for 2000 and 2002). Those below this level were treated as poor. Finally, for assets, all liquid assets (excluding land and housing) were valued at current market values. These were again compared to the poverty expenditure line. A poor household was defined as one that could not satisfy 3 months of minimum expenditure with its liquid assets. The cutoffs used to identify the poor for both the expenditure and asset coverage variables, while reasonable, are somewhat arbitrary.

Table 1: Chronic Poverty in W. Kenya by Four Measures (% of 103 households)

	Chronic Poor	Transient: Poor to Non-poor	Transient: Non-poor to poor	Non-Poor
Energy intake	11.7	14.6	30.1	43.7
Protein intake	35.0	15.5	37.9	11.7
Non-food expenditure	43.7	14.6	19.4	22.3
Liquid assets	62.1	5.8	10.7	21.4

A stark result from Table 1 is that the significance of chronic poverty viz the entire population and viz all types of poverty depends critically on the yardstick that one uses.

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[5] Non-food expenditures includes all items bought in the past 3 months such as health, education, fuel, clothing, and transport. The data on food were unreliable as the 3-month period was deemed too long for accurate responses.

In W. Kenya, it appears that most households are able to acquire sufficient levels of carbohydrates, mainly milled maize, even in relatively difficult times of the year. Hence fewer than 12% are classified as chronically poor according to this measure. Correspondingly, as many as 43.7% of households can be viewed as always non-poor using this measure. In sharp contrast to this result, taking a more diet discerning nutritional measure such as protein intake, one finds that the percentage of chronically poor climbs to 35% and the non-poor falls to a meager 11.7%. While beans are modestly affordable, most other good protein sources are much more expensive to purchase, and therefore a worsened poverty distribution is expected from this variable. Using per capita non-food expenditure reveals a similar percentage of chronic poor as with the protein measure (43.7%), but also gives a much larger percentage of non-poor households (22.3%). The asset measure shows the greatest concentration of chronically poor – 62.1% with a modest 21.4% being assessed as non-poor. In sum, despite being able to satisfy basic staple food needs, most households are not able to be nutritionally secure, afford basic expenditures, or accumulate assets with any continuity

Two other points from Table 1 are worth noting. First, while there is a sizeable group of transient poor using the food consumption and expenditure measures, the relative size of the transient poor in terms of assets is very small. This is sensible given that asset building processes are slower than consumption and expenditure processes. With marginal increases in income or production, food consumption will respond faster than will asset changes. Second, there is a worsening of poverty between 2000 and 2002 under all measures of poverty. The preceding rains in 1999 and 2001 were similar and normal. We do not have hard evidence about the production levels in each of the years, but we do not expect great differences. Rather, households talked much about increased expenditures and loss of assets associated with illness and death. Also, the macro economy exhibited no growth over the period and remittances to rural areas were said to have declined, almost to a halt, in many cases.

As we now proceed to disentangle who the chronic poor are and how they may differ from others in terms of farming systems and investments, we retain some of the ambiguity or fuzziness raised by Table 1. However, we shall heretofore delete the chronic poor definition based on energy intake since the number of households in that case is too few to render meaningful statistical analyses.

Table 2: Comparison of chronically poor under the protein intake and non-food expenditure definitions (% of households)

	Non-food expenditures		
Protein Intake	Chronic	Transient	Non-poor
Chronic	17.5	12.6	4.9
Transient	23.3	18.4	11.7
Non-poor	2.9	2.9	5.8

Table 3: Comparison of chronically poor under the protein intake and asset coverage definitions (% of households)

Protein Intake	Asset Coverage		
	Chronic	Transient	Non-poor
Chronic	22.3	4.9	7.8
Transient	34.0	9.7	9.7
Non-poor	5.8	1.9	3.9

Tables 2 and 3 shows how the different households are classified under different combinations of poverty measures. In Table 2, we compare how similar or different households are classified between protein and non-food expenditure measures of poverty. Since the aggregate percentage of chronic poor were similar in the two measures (35% - 43%), it is possible that there could be congruence in identifying the chronic poor. However, Table 2 shows that there is very little matching between the two variables, even for identifying the chronic poor. Table 3 displays even more disparity. In fact, 34% of all households had been identified as chronic poor by the asset measure, but are identified as transient poor by the protein measure. In both tables, between 59% and 64% of all households are not classified in the same way by the two definitions. All in all, it seems clear that how the characteristics and behaviours of the chronic poor compare to other groups is going to be highly sensitive to issues of measurement.

We now also omit further analysis based on the asset measure as this is not a well accepted basis for assessing chronic poverty and also because, based on Table 2, differences between this measure and the flow variables are almost assured.

5. What are the characteristics of the chronic poor

5.1   Quantitative assessment

Table 4 summarizes the household characteristics of the chronic poor compared to the transient poor and the non-poor based on crosstab and anova analyses. The identification of the chronic poor was done for both the protein and expenditure measures of poverty. The household characteristics are those reported in the year 2000, at the beginning of the period of assessment of chronic poverty. Four of the household characteristics were consistent across the two definitions. Education was a discerning variable such that secondary education was important in reducing the incidence of chronic poverty. For instance, using the protein definition, only 11% of the chronic poor households were headed by individuals with a secondary education, whereas the figure for other groups was around 24%. This confirms the results on the importance of education for the chronic and transient poor from other studies (McCulloch and Baulch 2000; Jalan and Ravaillon 2000). The chronic poor were less likely to have held a formal job than either the transient poor or the non poor. Using the expenditure measure, 43.5% of the chronic poor had held a formal job as opposed to 64% - 72% for the other groups. Family size and current farm size were consistent across poverty measure in that neither appeared to

contribute to chronic poverty status. These latter findings contrasted with results from Pakistan (McCulloch and Baulch 2000) and South Africa (Aliber 2001).

For other household characteristics, some relationships were found, but not consistently across the two poverty measures. Gender mattered – the chronic poor were more likely to be women (33.3% compared to 13.5% for other groups) using the protein intake definition (but the relationship was less stark using the expenditure measure). For ethnicity, slight opposing effects were noted between the Luo and Luhya communities depending on whether chronic poverty is measured by protein intake or expenditures. Taken all together, this analysis indicates that identifying who the chronically poor are is not a simple or straightforward task. Further, it shows that there are considerable unexplained dynamics between how households are structurally established and their ability to effectively manage assets, develop desirable livelihoods, and thus generate sufficient levels of consumption.

Table 4: Description of the Chronic Poor

	Chronic poor – protein intake	Chronic poor – non-food expenditure
Gender of household head	More likely to be women than other groups	Similar to transient; slightly more likely to be women than non-poor
Ethnicity	Slightly more likely to be Luos compared to transient and non-poor	More likely to be Luhyas than transient and non-poor
Farm size	Similar to other groups	Similar to other groups
Father's farm size	Similar to other groups	Slightly smaller than other groups
Family size	Similar to other groups	Similar to other groups
Education of household head	Less likely to have secondary education; otherwise similar	Less likely to have secondary education; otherwise similar
Formerly held formal sector job	Somewhat less likely to have held formal job than other groups	Less likely to have held formal job than other groups

5.2   Qualitative assessment

An examination of the poor, using case study histories, shows that structural variables cannot explain the extent and duration of poverty in isolation. We highlight the cases of two poor farmers in the study sites (see the appendix for their full case study descriptions). Eddah a mother of five children is only 44 years old and a small-scale farmer growing maize, beans and vegetables on three quarters of an acre. She opted out of school in standard three to get married and has been unable to make a turn around

since. And in 1989 when her husband died, he left her with no assets. Moreover, none of her children has been able to go beyond primary school. Poverty according to Eddah then is:

> 'Lack of a source of income … you have no child to send you money.
> However, if you have eyes, hands and legs, you can get something to eat.
> But, you cannot produce many sacks of maize or keep a grade cow
> because there is no money to buy fertiliser or food for the cow'.

Evidently, the poor lack a regular source of income or social networks upon which to turn for support. Here, remittances from employed children constitute a key component of the livelihoods of poor households and as such the poor too are those without any social security and this is pegged at the family level. It is also apparent that access to some food alone is just a bare minimum and does not warrant being considered non-poor. Instead, for as long as one struggles to survive and lack food stocks or assets such as is mentioned by Eddah, then one is still poor. Indeed, Eddah's account suggests that the poor are quite aware of why they remain poor and what it is likely to take for them to get out of poverty.

The above account also suggests that some people can become "chronic poor" because they are born into poverty and this situation is only perpetuated over time. In such instances, vagaries of weather, misfortunes and changes in life cycle only make the poor more vulnerable and therefore contribute to them sliding deeper into poverty. In this case, the causes of poverty are multiple ranging from macro and meso level forces (e.g. poor infrastructure and services) to particular household characteristics (e.g. lack of schooling).

On the other hand, one can slide into poverty, as is the case with Gilbert, a 70 year-old retiree. Although Gilbert has some land, most of it is of low potential and he is not able to utilise all available technologies fully. He finds that recommended farm inputs are either too expensive or labour intensive. In addition, his equally aged wife is sickly and cannot therefore participate much in farm work. Although the couple is still engaged in farming, this is only at a very small scale and much of their farm produce does not get to the market.

We also note from Gilbert's account that failure by children to wean themselves out of their parents' support could contribute to poverty as much as is the case with demands from other extended family members. Therefore, much as both Gilbert and his wife receive remittances, they have been forced to take into their care their eldest son's children. This sudden change has reduced their ability to provide sufficient basic needs for themselves.

Apparently, the chronically poor are identifiable although not easily. Secondly, the circumstances behind their poverty and especially the reasons that explain why they remain in poverty are intertwined in general livelihoods. Being poor and remaining poor is as much a result of individual omissions and commissions as it is an outcome of failure by others to provide as expected.

The case study analyses demonstrate clearly the role that adverse shocks have on people's livelihoods and welfare. It therefore reminds us that the use of our short duration quantitative assessment to actually identify the chronic poor would have some serious shortcomings.

6.   The chronic poor and farming practices

Using other definitions of poverty in a static context, other studies from the same region have detected significant differences in resources and farming practices between the wealthy and the poor. For example, some significant differences were detected in terms of land and livestock holdings (Place et al. 2002a). In terms of overall expenditure on agricultural inputs, one study found that the non-poor spent approximately $100 per year while the very poor only $5 (Rommelse 2001). Soule and Shepherd (2000) also found that yields, farm incomes, and soil quality were all substantially greater for the wealthier households as compared to the poor. In this section, some of these relationships are re-examined using the new classifications of poverty.

Table 5 shows the degree to which agricultural practices may differ across poverty groups. In terms of overall farming systems, all households grow maize and almost all grow beans – this is a common feature in the study site. Differences emerge with respect to the use of hybrid varieties for maize, where the chronic poor are less likely to use hybrids than the non-poor under either definition (the comparison to transient poor depends on the poverty measure). They are also slightly less likely to be growing cash crops than the non-poor. In terms of local cattle[6], one measure of poverty suggests that the chronic poor have fewer cattle, while the other suggests that there are no significant differences.

Also appearing in Table 5 are farming practices such as use of inputs. The chronic poor are less likely to use fertilizer than either the transient or non-poor. They are also less likely to use animal manure than the non-poor. This corresponds fairly well to how the chronic poor perceive their soil fertility relative to their neighbours. For instance, using the expenditure measure of poverty, 4.5% of the non-poor believe that their soils are worse than their neighbours, as compared to 15.6% and 27.3% for the transient and chronic poor. The chronic poor were unable to hire nearly as much labour as the transient poor (using the protein definition) and especially the non-poor (using either definition). Other differences depended on the definition of poverty. A good example was the use of credit. With the protein measure, the chronic poor were distinguished by their lack of credit use. However, with the expenditure measure, the rate of credit use of the chronic poor was similar to that of the transient poor and nearly equal to the rate of the non-poor.

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[6] Improved breeds of cattle are very rare in the study villages.

Table 5: Agricultural practices of the chronic poor

	Chronic poor – protein intake	Chronic poor – non-food expenditure
Cash crops	Same as transient; less likely than non-poor	Same as transient; slightly less likely than non-poor
Use of hybrid maize	Slightly less likely than transient or non-poor	Less likely to than non-poor; same as transient
Cattle	Similar to transient; slightly less than non-poor	Similar to other groups
Use of fertilizer	Less likely than transient or non-poor; amounts similar	Less likely to use than transient, much less than non-poor; amounts less than non-poor
Use of animal manure	Same as transient; less likely than non-poor	Same as transient; slightly less likely than non-poor
Soil quality compared to neighbours	Similar to transient; more likely to be worse than non-poor	More likely to be worse than transient; much more likely to be worse than non-poor
Hiring in labour	Hires less than transient and much less than non-poor	Similar to transient; hires less than non-poor
Use of credit	Less likely than transient; much less likely than non-poor	Same as transient; slightly less than non-poor
Sales from farm output	Similar to other groups	Similar to transient; less than non-poor
Current off-farm employment	Less likely than transient; much less likely than non-poor	Similar to transient; less likely than non-poor

Finally, in terms of generating diverse and productive livelihoods, the table shows that the chronic poor were in unfavorable positions in terms of having off-farm employment viz the non-poor, and this is largely in congruence with results from Uganda (Okidi and Kempaka 2002). The comparison to the transient group was dependent on the definition of poverty used. Farm sales of the chronic poor were expectedly smaller in comparison to the non-poor using the expenditure definition of poverty, but surprisingly were not different using the poverty groups formed from the protein intake measure.

To summarize, most farming practices were similar between the chronic and transitory poor. Fertiliser use was an exception, which differed significantly between the chronic and transitory poor. For half the variables, differences between the chronic and the transient poor depended to some extent on the definition of poverty used.

7.   The chronic poor and interest in new agroforestry technology

Tables 6 and 7 show crosstabulations between poverty classification (retaining the protein and non-food expenditure definitions) and adoption practices of new agroforestry technologies introduced for soil fertility amelioration.   An improved fallow is a fallow in which a fallow species is purposefully planted in a field.   Improved fallows are more efficient than natural fallows and can normally achieve a superior effect on crop productivity in a much shorter time.   In western Kenya, two nitrogen-fixing trees are favoured by farmers.   They are left fallow for one season, normally the short rainy season (October – December) after having been planted towards the end of the long rainy season (e.g. May).   Farmers then plant their crop (normally maize and beans) during the following long rainy season and may continue to cultivate the crop for more seasons using the residual fertility effect from the fallows.

Biomass transfer systems are those where organic nutrient sources are grown in one place and then transferred to crops in another place.   Farmers gather the leaves from the source plants off-farm or plant them on boundaries or contours on their own farms. They then incorporate the leaves into the soil at planting and sometimes use new leaf growth as a mulch later in the season.   This system allows farmers to grow crops continuously, which is an advantage over the improved fallow system, but the available space for producing organic nutrient sources on farm is limited.   As a result, farmers are using biomass transfer systems significantly and increasingly on high value crops such as kales and tomatoes, rather than the larger maize fields.

The description of adoption behaviour is based on analysis of use of the systems over a 5-year period since they were introduced in the villages.   Adopted means used at least twice in earlier and later years, dropped means used in early years but not since, and testing means used only once in later years.   An important issue here is how this sample was selected and therefore how adoption rates are to be interpreted.   Recall the sampling strategy defined in section 3.   Adoption rates are higher than those actually found (mainly in the range of 15% to 20% in the villages) because of stratifying on "likelihood of adoption".   Moreover, because of the sampling procedure alone, similar adoption rates across poverty class are anticipated.   Thus, the resulting figures are useful only for comparing how different adoption practices differ across the different definitions of poverty.   The absolute values are not representative of observed patterns.

A detailed analysis of adoption of these technologies by the poor in western Kenya using the larger group of 1,633 households can be found in Place et al. (2002b).[7] However, that analysis did not attempt to examine possible differences between the chronic and transient poor and that is the contribution of this section.   Tables 6 and 7 show that the protein poor, whether chronic or transient, are much more likely to have not yet tested the new agroforestry systems.   By itself this fact would on the surface support the usual conclusion that the poor have a difficult time in accessing new agricultural technologies. But inspection of the remaining columns paints a different picture.   Many (33%) of the

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[7] That analysis found that adoption rates were not significantly different for poverty /wealth groups (defined in different ways than the temporal definitions in this paper).

non-poor have abandoned each of the technologies, perhaps in favor of reverting to using fertilizer or manure. Many fewer of the poor, especially the chronic poor (8 - 11%), have dropped the use of the technologies, once tried. As a result, currently the adoption rate of improved fallows is higher among the poor and highest among the chronic poor. The rate of adoption of improved fallows by the chronic poor of 39% is quite outstanding in comparison to the non-poor (25%). For biomass transfer, current adoption rates are similar across the different poverty groups, which although it would be the expected outcome given the way in which the sample was selected, it reflects rather complex and unforeseen experimentation processes by different households (see columns 2- 4 of Table 7).

Table 6: Early patterns of adoption of improved fallows by the chronic poor and other groups (% of households)

	Never tried	Dropped	Testing	Adopted
Protein measure				
Chronic poor	44.4	8.3	8.3	38.9
Transient poor	49.1	16.4	3.6	30.9
Non-poor	25.0	33.3	16.7	25.0
Non-food expenditure measure				
Chronic poor	44.4	20.0	2.2	33.3
Transient poor	42.9	17.1	8.6	31.4
Non-poor	47.8	4.3	13.0	34.8

Note that adoption rates are not indicative of general patterns in the villages (those are in the range of 15 to 20 percent)

Table 7: Early patterns of adoption of biomass transfer by the chronic poor and other groups (% of households)

	Never tried	Dropped	Testing	Adopted
Protein measure				
Chronic poor	47.2	11.1	16.7	25.0
Transient poor	49.1	9.1	18.2	23.6
Non-poor	16.7	33.3	25.0	25.0
Non-food expenditure measure				
Chronic poor	46.7	20.0	17.8	15.6
Transient poor	42.9	5.7	17.1	34.3
Non-poor	43.5	8.7	21.7	26.1

Note that adoption rates are not indicative of general patterns in the villages (those are in the range of 15 to 20 percent)

The results for the <u>expenditure poor</u> are different. Differences in the percentages of households never testing the technologies are now much smaller across poverty group. Further, the pattern of dropouts according to poverty classification virtually reverses as compared to the analysis using the protein intake. Now, dropouts among the chronic poor are relatively high compared with the other groups.   The result of these patterns is that as of now, using the expenditure definition, adoption rates for biomass transfer are significantly higher among the non-poor (and the transient poor) than the chronic poor. For improved fallows, adoption rates are similar across poverty classification, rather than favoring the poor using the protein definition of poverty. Thus, whether one views the technologies as "friendly" for the poor, depends on how the poor are defined.

Logit regressions were run to test whether adoption behaviour differed among the three poverty/wealth classes after controlling for the effects of other variables (household head age, sex, & education; farm size, family size, ethnicity). For the regression, new testers were removed from the analysis as their intentions remain unclear. We also combined the "never tested" and "tested dropped" categories into a non-adoption group because of lack of observations in some cases.[8] The poverty/wealth categories were not significant in adoption patterns with one exception. Using the protein measure of poverty, the transient poor were less likely to adopt improved fallows than were the chronic poor.

8.   Chronic poverty and agricultural development in western Kenya

In this section we try to respond to four questions concerning rural households in western Kenya:

Is it easy to identify the chronic poor?
Are the chronic poor much different from the transient poor?
Do these two groups require different intervention strategies?
What are promising interventions for the chronic poor?

The identification of the chronic poor is not straightforward if one considers alternative measures.   There is not a strong relationship between food, nutrition, expenditure, or asset measures. Simply put, one is liable to classify significantly different households as being chronic poor by using different measures of poverty.   If one tries to combine different methods, the result will be an inability to identify many households that are either chronically poor or chronically non-poor.

The chronic poor differ from the transient poor in some characteristics, but not others. They do seem to differ with respect to education and exposure to formal sector

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[8] The full results are not reported here, because more reliable estimates of the effects of other variables can be ascertained from a much larger sample of over 1,600 households, from which the more intensive sample of 103 were drawn for detailed longitudinal assessment.

employment, for instance, but not as significantly, if at all, with respect to gender of household head, farmsize, and a host of other variables. This is again complicated by the different results generated from the use of different measures of poverty.

On the basis of our data, it would be difficult to recommend the formulation of different intervention strategies for the chronic or transient poor. But it should also be emphasized that this study was not designed to investigate nuances between the chronic and transient poor and thus our results are more suggestive than definitive.

Whether strategies are formulated for all rural poor together, or for chronic and transient poor separately, what are some ways forward? What is the potential for reducing poverty through agricultural interventions? It is clear that in the longer term (perhaps inter-generationally only), education is very important for both the chronic and transient poor. This is especially the case in view of the fact that farm size per se does not seem to be linked to poverty level. Diversification into attractive non-farm income sources seems to be one of the more promising strategies. But what is available in the short-term to households without such high education levels? While there are many possible non-farm jobs, for the most part, unskilled service sector jobs depend on overall economic growth and Kenya is in its fourth year of poor macro growth. Such jobs are therefore very limited.

The ability of agriculture to occasion growth for the poorest households is dependent on whether the sector is predisposed to do well and secondly, whether the poor are in a position to reap the benefits. In the latter case, we realise that whereas agriculture seems to keep the poor going it is not structured to enable them leap out of persistent poverty. The fact that they are poor tends to limit their ability to participate effectively in the sector particularly with regard to occasioning a meaningful turn around. For instance, although many of the households are largely dependent on their farms, the proceeds are unable to satisfy their needs and this is largely because yields are low. Yields are low because of lack of resources with which to invest in agriculture. Certainly, investments that require relatively large cash outlays are not feasible "next steps" for poor households. However, there are several low cost ways in which households can make incremental welfare gains. We have given an example of two organic soil fertility improving investments. Such investments appear to be feasible for the poor, but studies have shown that if the scale of investment is low, the benefits will be equally low (Place et al 2002). It seems clear that there are no magic investments for the poor. They will need to experiment with several welfare increasing options and must expect that the process of poverty reduction will be slow. In the meantime, they will also need to secure better safety nets (e.g. the build-up of social or physical capital) so that these strategies can be protected from the inevitable risks of adverse shocks.

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Appendix: Case studies

Case Study 1: Unable to Escape Poverty

My name is Eddah. I was born in 1958. I dropped out of school in standard three because I was rude. I use to run away from school and hide in the maize plantation. On other days I could run away when we are supposed to be punished. In 1973 I got married. I have five living children, four boys and one girl. Four other children died. All my children have never gone beyond standard 8; some dropped out of school in class 2. My husband died in 1989 leaving me without a thing, just bare hands.

My main occupation is farming. I plant maize, beans, *and kunde* on the three-quarters of an acre that my husband left me. I do not use any fertiliser because of lack of money. And even when I accumulate some farmyard manure I only apply this to places on the shamba that I feel are not fertile. In 1998 I planted improved fallow for the first time after attending an ICRAF meeting where I learnt about trees that add fertility to the soil. I happened to have been at the meeting because I was employed as a casual labourer and was keen to know what these people in good cars were coming to do around. In fact after this I harvested a lot of maize and this gave me the impetus to plant more trees. After that, my maize harvest improved from 2 *debes* to two bags.

However, in 1999 I stopped using ICRAF seeds. This was because we had been told to grow certain trees (*Tephrosia* and C. G*rahamiana*) so that when they mature we sell the seed to ICRAF. Towards the end of 1999 the *Tephrosia* and *Grahamiana* seeds were ready. However when the ICRAF people came they declared that my seeds were not suitable, that they had holes and were too small. I felt so bad that I didn't want to see them again. In fact I burnt the seeds ... However when I planted maize after removing the trees I harvested three bags of maize and eleven *gorogoros* of beans. I also hoped that the soil will give me good harvests for a longer time, but now my harvests have reduced to two bags of maize.

My other big problem is during tilling time. I lack labour because most of my children are away in towns doing casual jobs while others are looking for jobs. They don't even send something small to support me, so I toil alone from morning to evening. By the time I complete tilling, others have already planted. Sometimes I find myself delaying during weeding time. In fact this is part of the reason why I didn't go ahead with the ICRAF technology. I had no time to concentrate and no money to hire labour to help me plant the various types of seeds. And this year, hailstones spoilt the *Tithonia* that I had planted and at night thieves plucked my crop. I am a single woman and my children are not at home.

To supplement my farm income, I engage in the business of buying and selling vegetables mainly *sukuma wiki* (kale) and *kunde* (cow pea leaves) in a nearby market. On a good day such as end of the month, I make Kshs. 90 on an afternoon. On bad days I only earn about Kshs. 30 and all that money remains at the market. I have to buy a matchbox, salt, sugar, kerosene and some maize.

Source: Isikhuyu Village, Vihiga District

Case study 2: Why People Slide into Poverty

Gilbert retired and returned to his home village in 1993 after about 50 years in Nairobi. Since then, he works on the farm together with his wife Hellena. They have four grown up children all of who are married. The couple registered themselves as ICRAF farmers about three years ago.

Gilbert owns 1.3 Ha of land and one cow. Most of the land is on sloppy area down to a water stream. He says this land has not been productive and requires soil fertility improvement. Though he heard of what ICRAF taught people earlier he did not adopt it until the year 2000 when he decided to plant C. grahamiana and T.vogelli on the unproductive piece of land down the slope. He got C. grahamiana and T. vogelli seeds from ICRAF and has planted on the sloppy land now for one year. The major incentive in planting more C. grahamiana is that ICRAF buys seeds from them at a good price. However, so far, he has not been able to sell seeds to ICRAF because his plants are not mature yet. But, some people have already stopped planting C. grahamiana because it is long since ICRAF purchased seed from farmers. In addition, C. grahamiana has very large caterpillars and it is therefore not popular with most people.

Gilbert plants the indigenous varieties of maize and beans because he finds hybrids to be unaffordable. He has, however, used D.A.P once in 1994 but he says that these fertilisers make soils unproductive and salty in the long run. He has also used farmyard manure but his cows were stolen and the remaining one cannot provide enough manure for his farm.
On the other hand, Hellena Gilbert's wife sells fermented finger millet (*thowi*) at Yala market twice a week. She spends her profits on foodstuffs and occasionally hires labour to work on the farm. Because Hellena cannot carry this load to and from the market, Gilbert assists by transporting the *thowi* on his bicycle. When he gets committed elsewhere they organise with a nephew or any other bicycle transport to take it to the market.

Sometimes, Hellena and Gilbert get financial assistance from their younger son that is employed and has a fairly stable job in town. Their eldest son lives with them at home and it not responsible. He spends much of his time in politics and his wife is now also dependent on her parents-in-law, Hellena and Gilbert. In fact Hellena complained that this son does not even send his children to school claiming that he has no money. Hellena, however, intended to pay their school fees so that they could go back to school. Because they sometimes have nothing to eat in their house, Hellena shares what they have with them.

According to Hellena, a poor person is one who cannot carry out his/her farm work effectively because he has no source of income and lacks new ideas. Such a person has no food to eat and cannot send his children to school: "Look at my grand children here, they can not go to school because their parents can not afford it. Now I am trying to work hard to get for them some money to send them back to school." As for Gilbert, people in his village have different economic abilities. And, in his assessment, he is neither rich nor poor because he can afford to work on his own farm and harvest something for his food. Nevertheless, he feels that it is important to have another source of income besides farming especially when seasons change like has been the case on several occasions in the recent past.

Gilbert and Hellena concur that a rich person is one who has money, plants his own food and has surplus, has livestock, and new ideas that can be implemented successfully. They say that this is only possible when there is enough money for implementation. Hellena, however, stressed that money alone is not riches especially when it is not used well.

Source: Sarika Village, Siaya District