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Extending the Household Economy Approach to support the design of cash transfer programmes in Zambia

John Seaman, James Acidri, Masozi Kachale, Mary Khozombah, Lineo Mathule and Celia Petty

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Abbreviations

CT	Cash transfers
DFID	UK Department for International Development
HEA	Household Economy Approach
HEA+	Extended version of the Household Economy Approach
IHM	Individual Household Model
kcal	kilocalorie
MK	Malawian Kwacha
RHVP	Regional Hunger and Vulnerability Programme
SC-UK	Save the Children UK
WHO	World Health Organisation
WFP	UN World Food Programme
ZK	Zambian Kwacha

Executive Summary

Cash transfer programmes have been proposed as a means of providing benefits to targeted individuals or households in poorer African countries. Pilots have been run in some poorer countries with limited administrative capacity, but have not so far been expanded to a national scale.

A large programme aimed at poverty relief would require information to establish targeting criteria, and to estimate the proportion and number of poor households/people in different locations. These questions are not specific to the design of cash transfer programmes, but raise a general and longstanding problem of poverty measurement. Surveys are often dated, data is often difficult to obtain and the reliability of much of the income data is questionable.

A simplified method of obtaining household budget data, the 'household economy approach' (HEA), is widely used at a national scale in southern Africa for crisis prediction. The HEA model is used to simulate the impact of changes in the economic context, for example the impact of a crop failure and/or a price change on the (reference) income established by survey.

The HEA is practical and economical in use and appears to give reliable income estimates. However, the technique uses a simplified data set which does not allow the level of discrimination between households necessary for the design of social protection programmes.

The Individual Household Model (IHM) was developed to overcome the limitations of HEA witha view to modelling a wider range of changes to individual households. IHM is based on household demographic, asset, and income data obtained from individual household interviews. The limitation of IHM is that so far it has not been applied on a large scale and is relatively expensive in use and demanding of skills and organisation.

An extended HEA model (HEA+) was designed to combine the practical advantages of HEA and at least some of the detail supplied by data from individual household surveys. The question is whether the collection of a small amount of data additional to the standard HEA data set provides a sufficient increment in information to potentially extend the use of HEA to cash transfer programmes.

The study was conducted in Kazangula District in Southern Zambia from a base in Livingstone. The initial intention was to work in four villages in two livelihood zones, for one of which (Zambezi Valley West) HEA data already existed. However, unforeseen difficulties occurred and data was only obtained from a single village. The economy of the study village is primarily agricultural, and food aid was distributed in the village through a number of channels.

Household income estimates were made using HEA+ and IHM. A fairly good fit is obtained between the two methods. The differences between the income estimates obtained using the

straight line model and the individual household data are 0.2%, 8.5%, 13.5% and 3.9% for the 'very poorest', 'very poor', 'poor' and 'middle' groups respectively.

There is a close correspondence between the actual household income estimate in the reference year and the HEA+ model. The findings also tend to support the reliability of the HEA data.

HEA+ can be used to obtain estimates of:

- the proportion of poor households/people in each livelihood zone,
- the cost of bringing this population up to the standard of living threshold,
- changes in poverty rates following changes in production, assistance and the price of traded goods,
- information which may be useful to establish targeting criteria.

Assuming that an HEA data set was being gathered or an existing data set was being updated, the additional cost of using the HEA+ model would be very low. On the experience of the pilot the HEA+ data set would add approximately 5-10% to the work required to gather a 'standard' HEA data set.

A single small study is obviously insufficient to establish the validity of the proposed method and further experimentation is required. Further testing of the method would be most simply and economically done in a location where existing HEA data sets were already being updated. This would give a much larger HEA sample than was available in this study. Individual household income data could be obtained from an appropriate sample of households from the HEA sample sites, rather than from a single village.

However, most countries already have a poverty measure, and if HEA+ were used as a poverty measure there are outstanding questions about sampling. It is therefore important for further development of the method to be done in agreement and discussion with the relevant national agencies.

1 Introduction

'Cash transfer' (CT) programmes have been proposed as a means of providing benefits to targeted individuals or households in poorer African countries, first to alleviate poverty, by increasing the resources available to meet basic needs, including health and education; and secondly to allow vulnerable households to invest in productive assets and escape poverty in the long-term. Pilot CT programmes have been run in some poorer countries with limited administrative capacity eg in Zambia and Malawi, but have not so far been expanded to a national scale (Schubert 2005, Schubert and Kambewa 2006).

The statistical information required to support the design and operation of a national CT programme will depend on the programme objective. Information needs can be minimised by targeting easily identified individuals, for example the elderly[1], or by limiting beneficiary numbers to an arbitrary maximum of the population, eg current pilot programmes identify the poorest 10% of households through community discussions and target CT at those with a high dependency ratio. A CT programme giving larger transfers with more ambitious objectives would require a measure of poverty and information, for example on household characteristics, which could be used to identify beneficiaries. Without this it will be impossible to set a benefit level to achieve a particular programme objective, to establish the number of beneficiaries or the programme cost.

Given the administrative constraints in many poorer countries it is an open question if such programmes are a realistic option and it may be that other routes to poverty alleviation, for example the provision of farm inputs, food, school and health fees, or price stabilisation may be a more practical approach. Nevertheless, if a large programme aimed at poverty relief were planned the following would be required:

- Information to establish targeting criteria, eg household demography, asset holding etc.

- Information to estimate the proportion and number of poor households/people in different locations. This would be required to allocate resources between populations and to estimate the cost of achieving a defined impact. As both the rate and severity of poverty are not constant, varying from year to year with changes in production and the price of traded goods, some means will be required to estimate the size of these changes. Additionally reliable census information will be required to estimate the size of the targeted population.

[1] Pension schemes have been run in the Republic of South Africa, Lesotho, Bangladesh and elsewhere (see DFID 2005).

These questions are not specific to the design of cash transfer programmes, but raise a general and longstanding problem of poverty measurement. In principle information on household income and household characteristics should be available from existing household income/consumption surveys. However these surveys are often dated, in many cases the data is difficult to obtain and, perhaps most seriously, there are questions about the reliability of much of the income data available. There are techniques (outlined in this paper) which can give reliable income estimates from individual households but these, although not difficult, require a level of attention to detail which so far precludes their use on a large geographical scale.

A simplified method of obtaining household budget data, the 'household economy approach' (HEA), is widely used at a national scale in southern Africa for crisis prediction. The HEA is practical and economical in use and appears to give reliable income estimates. However, although HEA provides some information on all the variables identified above, the technique uses a simplified data set which does not allow the level of discrimination between households necessary for the design of cash transfer or other social protection programmes.

Following a DFID request for a practical large-area method which could be used to support CT programming, an extended version of HEA ('HEA+') was developed. This pilot study was conducted to see if this approach would be capable of providing a sufficient increment in the information obtained to inform the design of cash transfer programmes.

The pilot was conducted in Kazangula District in Southern Zambia[2]. Several practical difficulties were encountered during the study with the result that less data was obtained than anticipated. Although the results obtained are reasonably encouraging, further testing of the proposed approach will be required.

2 Assessment team: John Seaman and Celia Petty (Evidence for Development), James Acidri (Food Security project manager, SC UK, Zimbabwe), Lineo Mathule (Lecturer, Nutrition Dept, National University of Lesotho), Mary Khozombah (Food Security consultant), and Masozi Kachale (VAM Officer, WFP Malawi).

2 Background to the methods used

2.1 The Household Economy Approach

The Household Economy Approach (HEA) was developed in the 1990s as a method of famine prediction. The approach uses a simplified data set describing the economy of a defined population of households in a reference year, in which conditions are known, to model the impact of an external change (typically to production, price and/or market access or a combination of these) on the ability of households to acquire food under stated conditions, for example of household non-food requirements. The data set describes the economy of a defined population/area (a 'livelihood zone') in terms of the income obtained from different sources (as food and money) by 'typical households' (Figure 1) each of which represents a 'wealth group'. HEA can be used to map large geographical areas at reasonable cost and has been widely used chiefly in southern and east Africa. Conceptually the method is based on Sen's entitlement theory (Sen 1981).

HEA data is gathered in two stages. First livelihood zones are defined. This is done largely from secondary sources and 'key informants'. Livelihood zones are often broadly contiguous with agro-ecological zones. Then group interviews are conducted at a sample (depending on the objective) of ten or more sites within each livelihood zone. At each site:

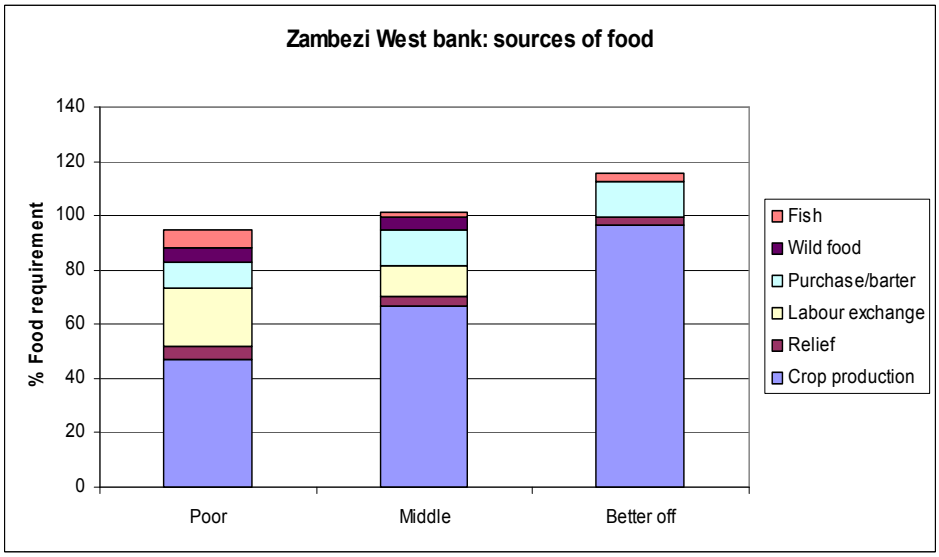
- The 'wealth groups' recognised by the community (eg 'poor', 'middle', although there are often vernacular names for these) are recorded. The characteristics of these groups and the percentage of the population falling in each are established in a community interview. Wealth group characteristics include livestock, land and other asset holding, and the principle agricultural and off-farm income sources.

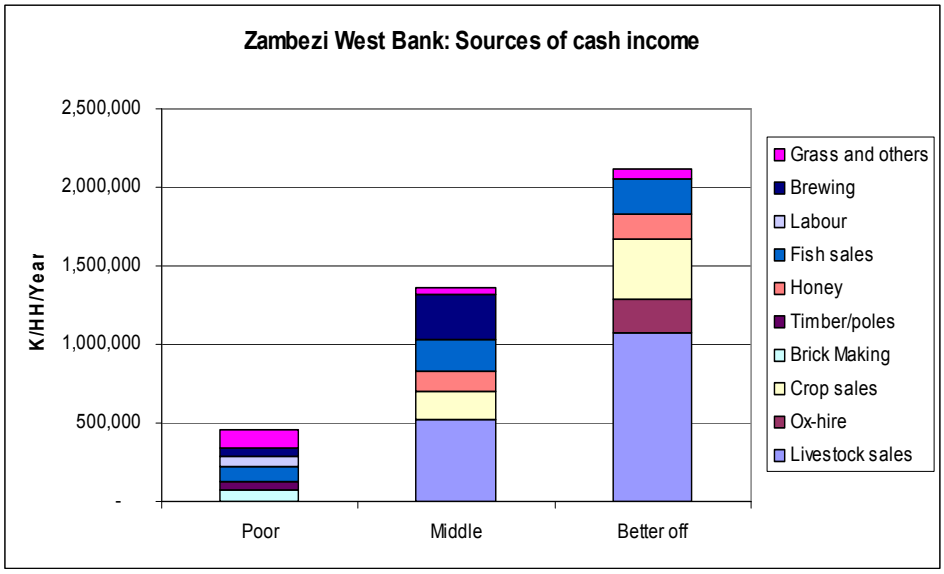
- The wealth group classification specifically omits households which obtain their income by means outside the general occupations used in that place ie usually a small number (i) of the very poorest households which live by charity, begging etc. (ii) the 'super rich' ie the household or households which are characterised by a larger income than other households eg landlords and traders.

- Wealth group interviews are conducted with groups (typically 6-10 people of mixed age and sex) from each defined wealth group ie a group of 'poor', a 'middle' group etc. Each interview is conducted with reference to a 'typical' household representative of that group, the characteristics of each typical household being defined in discussion with group members. Data is gathered on asset holding, the amount and source of income obtained as food (from crops,

livestock, payment in kind, gifts etc), as cash (from crop sales, employment etc) and expenditure in the reference year.

Figure 1a & 1b: HEA data for the Zambezi West Bank livelihood zone (Household economy profiles. FEWSNET/FEG)





As with any income measurement there is no clear measure of the accuracy of this technique. However HEA data sets: i) allow a large amount of internal triangulation eg between land and agricultural returns; ii) must be consistent with biological need and the observed standard of living. Data gathered by different observers in the same location tends to give very similar results and, for its intended use in famine prediction and assessment, it has proved remarkably accurate (see SC-UK 2002).

The HEA model is used to simulate the impact of changes in the economic context, for example the impact of a crop failure and/or a price change on the (reference) income established by survey. For example if the 'typical household' representing a wealth group was estimated to obtain 50% of its income from crops, and crop production fell by 50%, this would imply a 25% fall in income. Allowance is then made for the ability of the household to 'cope' with this, for example by selling assets or obtaining wild foods, under different price conditions. The range of changes which can be simulated include any change to production, other income source and/or the price of any item produced or exchanged by the household, in any combination. Reflecting the uncertainties in contextual variables (eg price projections) the model is used to develop a range of scenarios which can be tested against observation, for example of actual price change, as the situation develops.

For poverty measurement the chief limitations of the method are that:

- 'wealth groups' are defined by the community in terms of asset holding (mostly land, livestock, labour and combinations of these, although it may also include other productive assets). The characteristics of wealth groups are therefore different in different livelihood zones.

- a 'wealth group', may represent a large proportion of the population, for example the 'poor' may represent as much as 60% of the population. This limits the wider use of the method, as this average gives no information on variability within the wealth group.

2.2 The 'Individual Household Model' (IHM)

This method was developed to overcome the limitations of HEA with a view to modelling a wider range of changes to individual households, eg incapacity and other changes within the household, development interventions etc. The IHM is based on household demographic, asset, and income data obtained from individual household interviews, ie as are other household budget surveys. The chief differences between IHM and conventional household income surveys are that:

- Data collection techniques have been developed which seem likely to produce accurate income estimates. The techniques used include: i) preparatory work to ensure that the basic features of the local economy are well understood and that interviews reflect local conditions; ii) semi-structured interview techniques; iii) keeping interviews short by restricting the content of the interview to the minimum information required, (usually household demography, asset holding and income in a defined period); iv) checking the household data in the field using specialised software to ensure that the data is internally consistent and consistent with biological needs and observed living conditions, and revisiting households where it is not.

- In order to make the approach operationally applicable specialised software is used which allows results to be obtained and modelling done very quickly after the field work is completed. The models used are, as with HEA, simple simulations.

The IHM has been used in several locations to model the economic impact of HIV/AIDS, changes in coffee prices, etc at household level (see www.EvidenceforDevelopment.com).

The limitation of IHM is that so far it has not been applied on a large scale and is (as with conventional household budget surveys) relatively expensive in use and demanding of skills and organisation.

2.3 Reasoning for the proposed method (HEA+)

A method is required which can provide the information outlined in the introduction, at acceptable cost using reasonably available skills, ie which combines the practical advantages of HEA and at least some of the detail supplied by data from individual household surveys. As large, in some cases national, HEA data sets already exist HEA was taken as the starting point. The question addressed was whether the collection of a small amount of data additional to the standard HEA data set would provide a sufficient increment in information to potentially extend the use of HEA to CT programmes. Specifically, the aim of the pilot was to see if:

- the HEA data set could be extended to give a better estimate of the variation in income within wealth groups.

- it is possible to rapidly identify the HEA 'wealth group' into which individual households fall, for example using key informants. That is, is it possible to identify if a particular household falls into the 'poor' category or another wealth group. As data on the characteristics of individual households (demographic, asset holdings etc) can quickly and cheaply be gathered by rapid house-to-house survey this allows the relationship between household characteristics and 'wealth' to be established.

The rationale of the proposed method is as follows (Figure 2 below):

- A standard HEA income data set contains information on the amount of income as food and as cash and the sources from which these were obtained (Figure 1a & b) and the proportion of households which fall into each group. From this the total income of each wealth group in a defined reference year can be calculated Figure 2a.

- The income histogram shown in Figure 2a can be redrawn to incorporate the proportion of households in each wealth group (Figure 2b).

- By definition wealth groups are continuous ie the richest household in the poor group (A) should be a little poorer than the poorest household in the middle group (B), the richest household in the middle group a little poorer than the poorest household in the 'better off' group and so on.

- Therefore if the lowest value, ie the income, of the poorest household in the population (E) is known, it should be possible to construct an approximation of a continuous income distribution from the series of wealth groups by fitting a series of straight lines (Figure 2c). The shape of the income distributions makes it possible to obtain close fits using very few lines.

As noted above the very poorest households (typically a diverse group of the 'asset poor' population ie the elderly, ill, disabled, and new households which have yet to acquire an asset base) are unrepresentative of the larger 'poor' group and are excluded from the HEA wealth group definition. In the reasoning here this forms a discrete ''very poorest' wealth group.

Figure 2a: HEA data showing total income (MK/person/year) by wealth group, including a 'very poorest' group

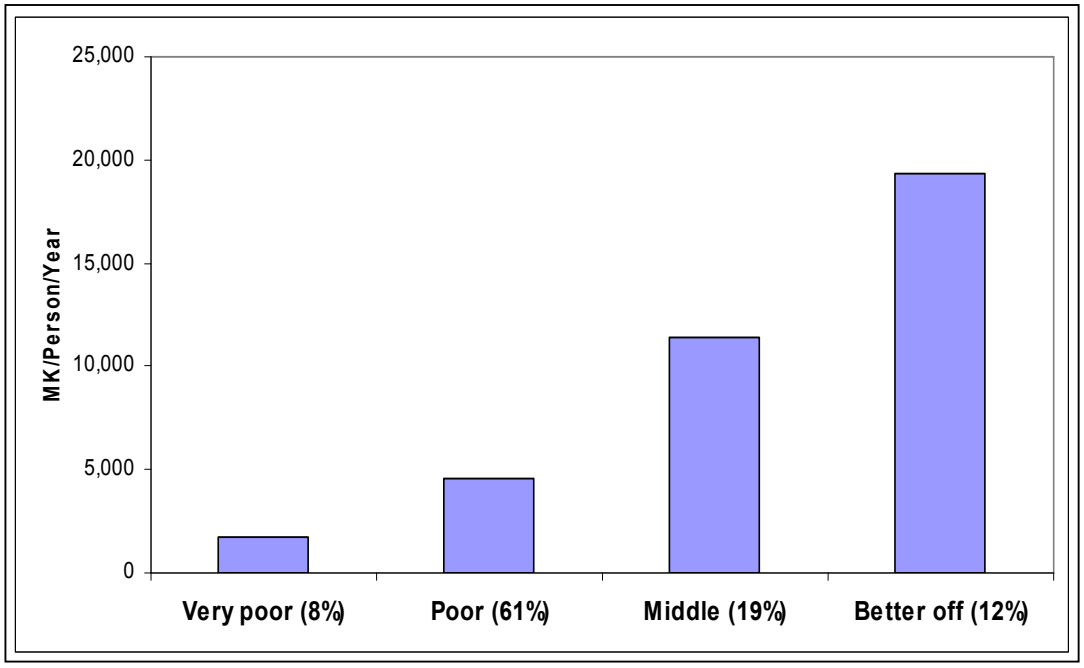
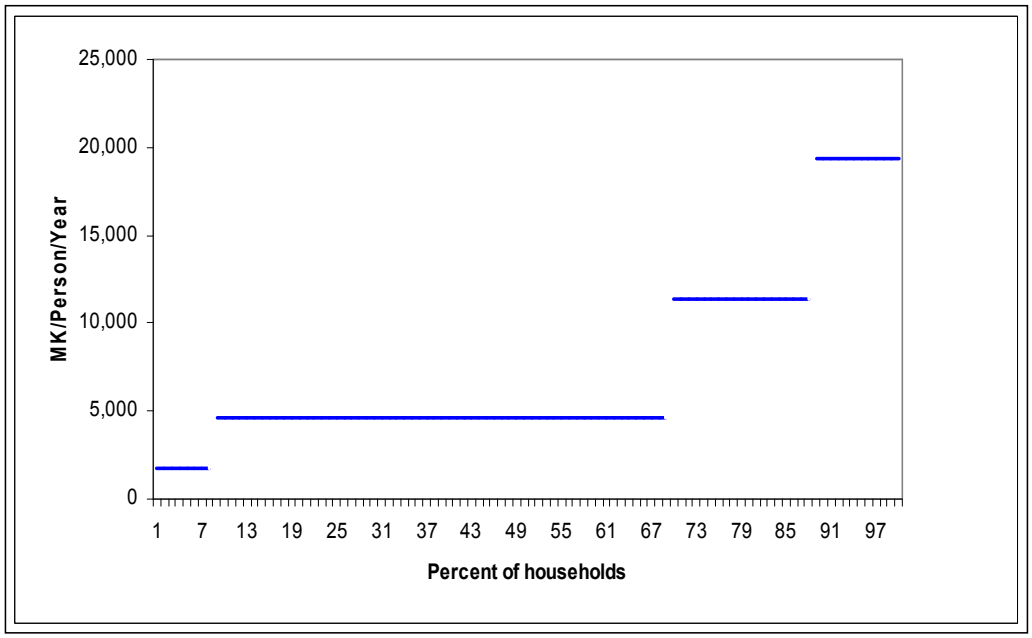
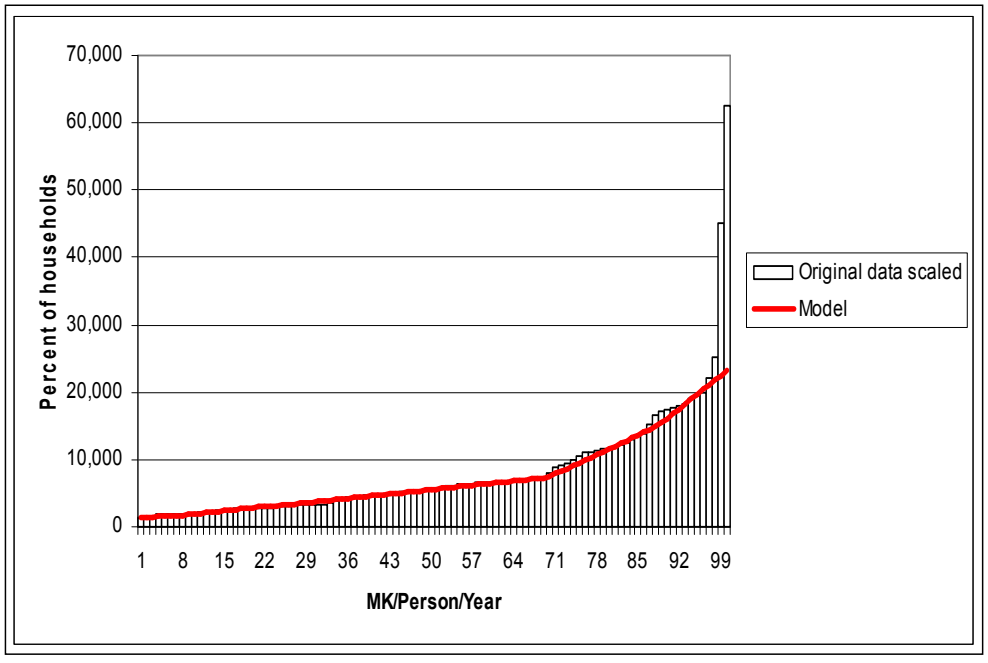


Figure 2b: The same HEA data redrawn to show the percentage of households in each wealth group.



Point A should be continuous with point B (ie the richest household in the very poor group should be slightly poorer than the poorest household in the 'poor' group), point C with D etc. E indicates the poorest household.

Figure 2c: Straight line fit



In Figure 2c, the lines in the middle graph are redrawn, starting with the poorest household, and connecting A to B, C to D etc to create a straight line fit approximating a continuous distribution. For comparison the original data from individual households, scaled to 100% is shown.

HEA data has been derived by averaging sections of the data from individual households. The result (Figure 2c) is an approximation of a continuous income distribution, which could be used:

- to obtain a more useful poverty estimate than the simple averages obtained from HEA wealth groups, ie a measure of both the number of households below a set standard of living threshold or some other cut off, and a measure of the severity of poverty within this group. This would allow estimates to be made of the cost of transfers to meet specific objectives in each livelihood zone and potentially by administrative area[3].

- As with HEA, HEA+ would allow estimates to be made of the impact of changes, eg to crop production, in each livelihood zone by modelling.

- information on the characteristics of households within wealth groups which might provide a basis for targeting.

[3] For example, in Malawi the country has been subdivided into small 'enumeration areas', the borders of which have been reconciled with the borders of districts and other administrative areas, and livelihood zones. This allows HEA information to be expressed in terms of administrative areas, for example where a district contains part of two or more livelihood zones.

3 The study

3.1 Background

The study was conducted in Kazangula District in Southern Zambia from a base in Livingstone. The study had two aims:

- to estimate household income using two independent methods:
  - the extended version of the Household Economy Approach (HEA+), outlined in section 2 above.
  - income data from each individual household, ie IHM.

  to see if the straight line approximation of the income distribution (HEA+) corresponded with the income distribution estimated from individual income estimates (IHM).
- to see if 'key informants' could place individual households within wealth groups and to relate this to the estimates of individual household income.

The initial intention was to work in four villages in two livelihood zones, for one of which (Zambezi Valley West) HEA data already existed. However it was not possible to select the study sites before the team arrived and several difficulties were encountered:

- It was difficult to find suitable villages for the study. Settlements within reasonable reach of Livingstone tend to be small, with houses dispersed over a wide area. Two villages were located within a practical range of Livingstone (approximately 50km and 60km) although when mapped these turned out to have many fewer households than estimated.
- The reference year used (the agricultural year 2005/06) was a year of low crop yields and during that year most households received substantial amounts of food aid. After three days' work in one village it was clear that co-operation was lacking, apparently because of villagers' concerns about the relationship between the survey and food aid, and the study in that village was abandoned.

Due to the short time available for field work the remaining time was spent on obtaining data from a single village. That village was very co-operative but had the disadvantages that:

- it was small (forty households, 212 people), with the result that there are very small numbers of households in some wealth groups.

- there were strong economic connections between some related households and some difficulties in defining households. In some cases the village defined a household as distinct whereas it was clear that the household was part of another household, ie they shared income and cooked and ate together. The cases where this occurred chiefly related to elderly people who in principle qualify for a vulnerable group ration (although during the survey reference year only one person in the village actually received this).

The economy of the study village is primarily agricultural, the rain-fed crops grown including maize (the main staple), sorghum, millet, groundnuts, bambara nuts and cowpeas, and a range of other crops including sweet sorghum, squashes and pumpkins. Some (37%) of households cultivate tomatoes, rape and other vegetables, primarily for sale, on small plots irrigated from a barrage. Chickens, cattle, goats, and pigs are kept. Opportunities for paid agricultural employment within the village are very limited. Self employment includes handicrafts, brewing and petty trade (salt and soap). Some income is obtained from remittances, primarily from Lusaka, and there was a single pensioner.

During the reference year food aid was distributed in three ways: i) a take home ration, received by any household with a child at primary school. This was mainly of maize and given in nine of the twelve months of the reference year (ie 450kg/ maize household). Small quantities of beans and oil were given in a two month period; ii) a school breakfast of Corn Soy Blend (CSB), for each child attending the community school. Assuming a normal pattern of attendance this amounted to 3.6kg/child in the reference year; iii) a 'vulnerable group' ration of 600kg maize, received by one elderly person.

Due to the poor quality road (24km) between the village and the main Lusaka–Livingstone tarmac, the high cost and infrequency of motor transport, and the small amount of cash in circulation, most trade in the village was in terms of barter.

3.2 Methodology

Two estimates of household income were made: i) using the extended version of the Household Economy Approach (HEA+); ii) by collecting income data from each individual household.

- HEA+. Standard HEA techniques were used for the community interview (ie wealth groups were established) and for wealth group interviews. An additional interview of a 'very poorest' wealth group (the three poorest households) was carried out. The village chairman identified members of this group.

- An IHM data set (household demography, assets and income in the reference year) was obtained by interviewing each household in the village. To ensure

complete coverage the village was mapped and each household given a unique identity.

Data was gathered by three team members with experience of HEA and three with additional experience of obtaining income data from individual households. Care was taken to ensure that the HEA and IHM teams worked separately to ensure that the results did not influence each other, although in practice it is difficult informally to predict the results of one method by using the other.

The reference year taken was from March 2005 to February 2006 (ie green maize to green maize).

The price of each traded commodity for the post-harvest period in 2005 and the end of 2006 was gathered from key informants. For livestock and other goods which vary widely in price, prices were also gathered during individual interviews. Equivalent values for barter items were established, for example ploughing 0.25ha costs two chickens, which in turn was equivalent (in the reference year) to 20 litres (18kg) of maize or approximately 20,000ZK. Mid-year prices (maize prices went very high in late 2005) were used throughout.

Most measures used in the village are volumetric and standard weights for the main measures were established using a (Salter) electronic balance reading to 2g. Conversion factors for ox carts were established for each ox cart in the village, as these vary in size. Conversion factors were also established for relevant crops, eg the oil rich Mungogo nut which may be eaten or converted to oil, shelled and unshelled groundnuts etc. Energy values were taken from standard food tables and, for mangos and green maize cobs, from measurements made during previous studies. Information was collected on the quantity of oil nuts gathered by individual households. For other wild fruits (fourteen types were identified, although not all of these are eaten in quantity or by all people) an estimate of total consumption was obtained and a single energy value was used (600kcal/kg).

One key informant who participated in the community interview was asked to place each household in its respective HEA wealth group.

3.2.1 Data quality and data analysis

No difficulties were encountered with data collection from individual households. Information on paid employment, in most locations the most difficult information to gather (because of fluctuating work availability, difference in wage rates between men and women etc), was easily obtained as there were few opportunities available. Income from green groundnuts, green bambara nuts and honey was missed in a few cases but relative to total income this is very small. Villagers were entirely open (ie they spontaneously offered information) about cases where households had reorganised themselves to obtain food aid.

The HEA data for four data points ('very poorest', 'very poor', 'poor' and 'middle') are reliable. The interview for the better-off group was not of sufficient standard to include this in the analysis.

The IHM results were obtained using specialised software. HEA calculations and fitting straight lines to the HEA data were done using a spreadsheet. The same prices and food energy values were used for both analyses.

Three households were omitted from the IHM analysis. Two of these were individuals (one an elderly blind woman, the other a young disabled man) who obtained their income largely from gifts from a variety of sources. Although in both cases it was clear that their total income approximated their minimum food energy needs with occasional gifts of clothing, it was impossible to quantify this and these interviews were not consistent with the remainder of the data set. The other household was omitted because the head of household, a salt and soap trader, was absent throughout the survey and information could not be obtained on trading income.

3.3 Results

The HEA and IHM results are shown in Figure 3a and 3b. A more detailed breakdown of the IHM results is shown in Figure 10. Results are presented in terms of total income expressed in terms of food energy (Kcal). This was used rather than money because i) no price could be obtained for some wild foods and for some crops which are not traded; and ii) for most transactions payment was in kind.

The findings were standardised using the appropriate method for each technique. HEA was standardised by the number of people in each 'typical' household and the estimates of individual household income were standardised by the number of 'adult equivalents', where one 'adult equivalent' = the total energy requirement of the household, calculated by age and sex, divided by the average energy requirement of a young adult male and female.

Individual energy requirements were drawn from the World Health Organisation (WHO, 1985).

Figure 3a: HEA - Estimated income (Kcals/person/year) by income category for four wealth groups (the better-off group is omitted)

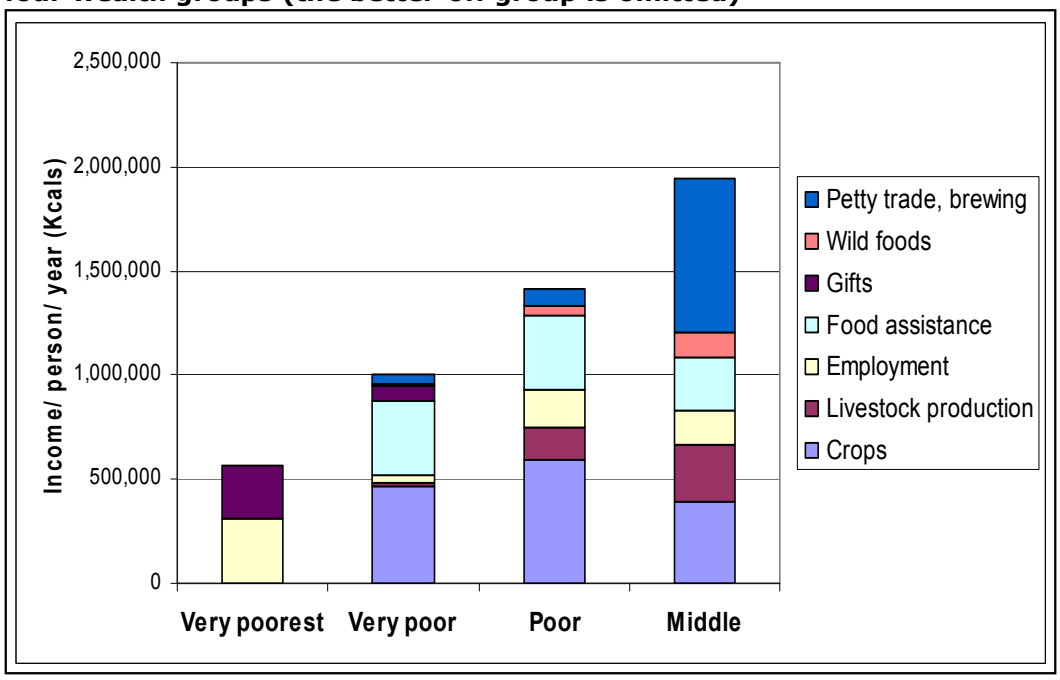
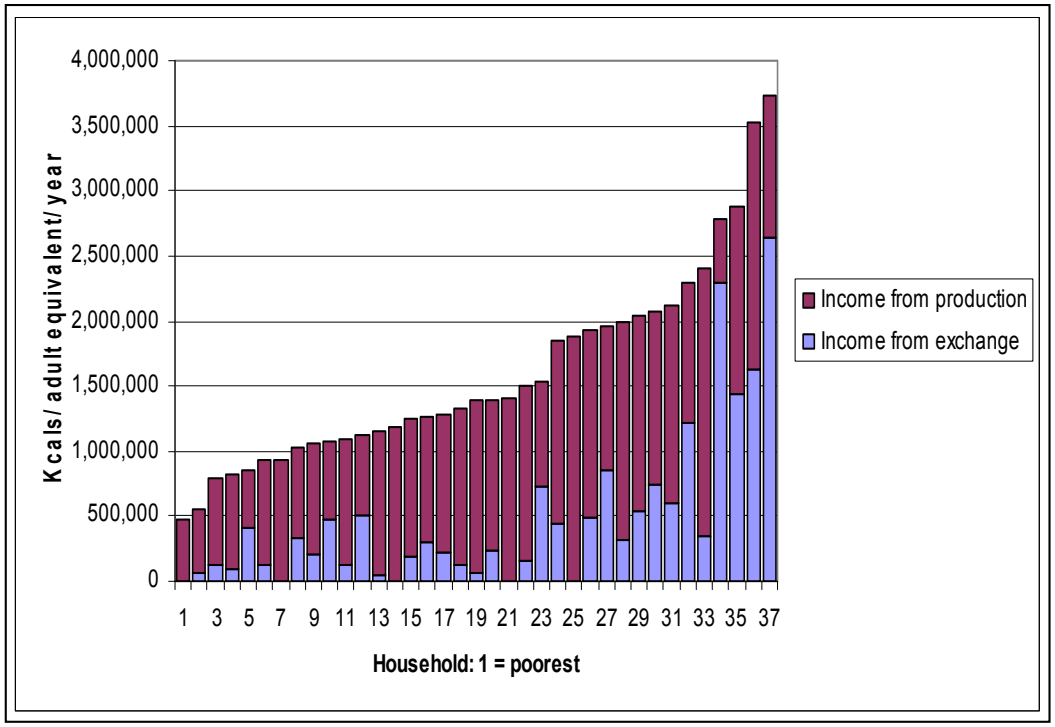


Figure 3b: IHM (Kcals/ adult equivalent/ year): i) consumed from production; ii) from employment , crop sales and other exchange



3.3.1 Fitting straight lines to the HEA data

The straight line model requires: i) HEA data for each wealth group, including the income of a 'very poorest' group; ii) the percentage of households in each wealth group; iii) a value for the very poorest household in the data set in order to establish the origin of the line and its slope. The income of the poorest household was obtained from the individual household estimate.

The line (Figure 4) was constructed as described in section 3 by drawing: i) the line for the very poorest group, using the value for the poorest household as the start point. The slope of the line is established from this value and the value for the 'very poor' group; ii) the upper end of the 'very poorest' line is used as the origin for the next wealth group (in this case 'the very poor') and the slope in the same way. This process is continued until the last (in this case 'middle') wealth group is reached.

3.3.2 Comparison of findings of HEA+ and individual household income estimates

Figure 4 compares the HEA+ straight line fit and the income estimates from the IHM. To allow the findings from the two methods to be directly compared, the individual household values have been scaled to one hundred. The HEA data for the better-off group is not shown as the data is unreliable. A standard-of-living threshold is shown based on an approximate cost/person of achieving the standard of living of a 'poor' household in the study village of ZK297,500/person/year. This includes the cost of house repair, minimal health costs, clothes, paraffin, matches, utensils, soap, school costs and cooking oil. Note that in Figure 4 this is shown in Kcal/person/year. Eighteen percent of households fall below this level.

A fairly good fit is obtained between the two methods. The differences between the income estimates obtained using the straight line model and the individual household data are 0.2%, 8.5%, 13.5% and 3.9% for the 'very poorest', 'very poor', 'poor' and 'middle' groups respectively. The relatively poor fit for the 'poor' group is at least partly due to the small number of individual household income estimates obtained and the (presumably chance) irregularity of the income curve. Lorentz curves for the two sets of values are shown in Figure 5.

Figure 4: Comparison of: i) a straight line approximation of a complete income distribution derived from the study HEA data (HEA+); ii) the individual household income data, scaled to 100 households to allow comparison with the straight line; and iii) the standard of living threshold

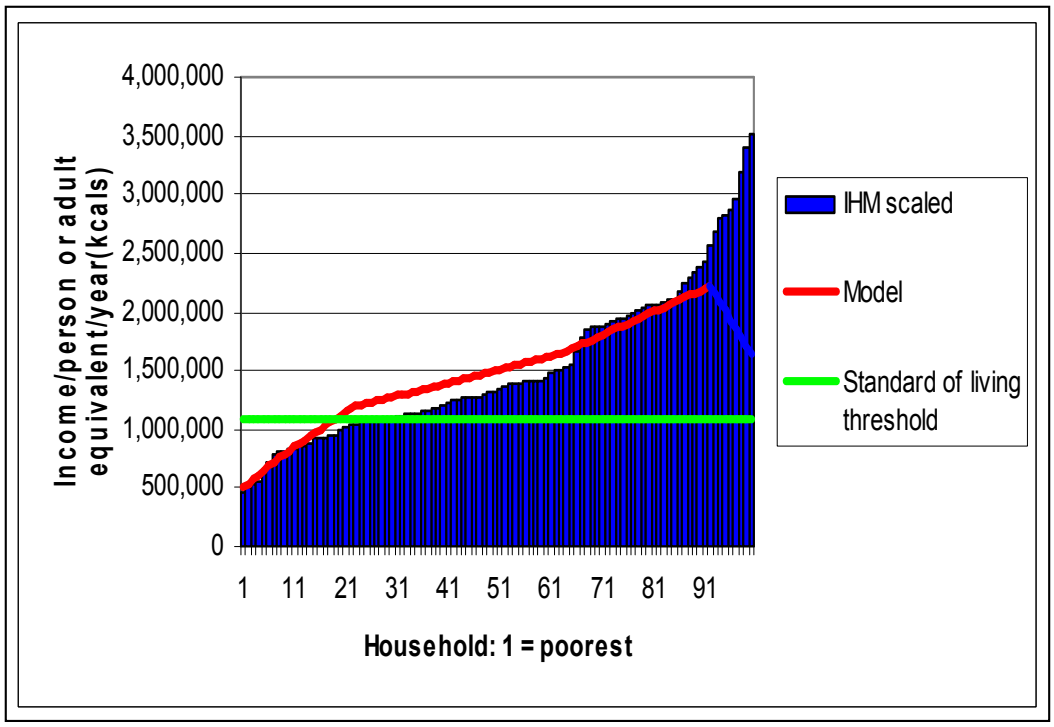
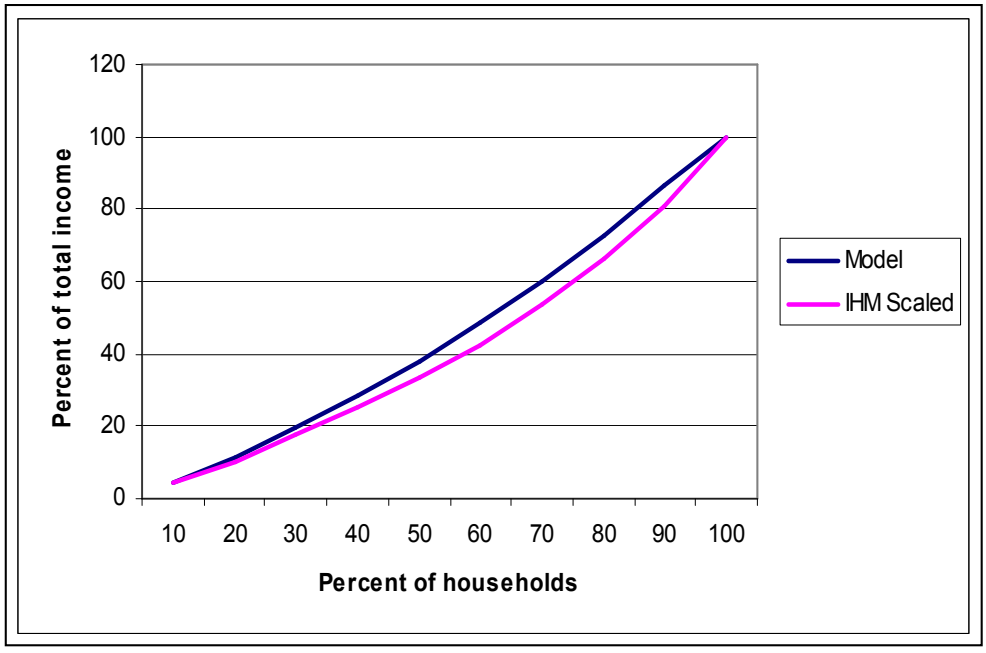


Figure 5: Lorenz curves derived from: i) the HEA+ model; and ii) the individual household income estimates (data as in Figure 4)



3.3.3 Relationship between wealth (HEA) and income (IHM) of individual households

HEA wealth groups are defined in terms of productive household assets (land, the quality and quantity of labour, livestock etc). IHM estimates actual household income in a defined period. It would be expected that the two measures would correlate, although the strength of the correlation would vary according to the conditions under which assets were employed. For example in a year of drought the amount of land cultivated might be a poor guide to income from that source.

The household characteristics which define wealth groups in the study village, obtained in the community wealth interview group, are shown in Table 1. It should be noted that:

- These characteristics do not all exactly apply to any individual household eg a household might have one lima of land and ten chickens and fall between the very poorest and very poor wealth groups.

- For the very poorest and better-off wealth groups the number of households with individual household data is very small (N=3 for each group).

- Two of the 'very poorest' households were omitted from the individual household analysis.

- Some exceptional sources of income recorded in individual interviews, primarily in middle and better-off households, are not reflected in the HEA data. These include the large vulnerable group ration received by one better-off household, pension income etc.

There is no completely objective method of classifying individual household interviews into their respective HEA wealth groups.

Table 1: Wealth group characteristics obtained during HEA community interview

Wealth group	Very poorest	Very poor	Poor	Middle	Better off
% households in group	9	13	41	29	8
Total land area cultivated	1 lima	2-4	4-8	8-16	16-40
Food crop area	1	2-4	4-8	7-14	14-36
Cash crop are				1-2	2-4
Main crops grown fro sale			Vegetables	Maize Cotton Vegetables	Maize Cotton
Main crops grown for food	Maize Sorghum	Maize Sorghum Groundnuts	Maize Sorghum Groundnuts Bambara nuts Cow peas	Maize Cassava Sorghum Groundnuts Bambara nuts Pumpkins	Maize Sorghum Groundnuts
Livestock holdings:					
Cattle	0	0	1-2	2-4	>=5-15
Goats	0	1-2	4-5	5-10	10-15
Pigs	0	0	0-1	0-1	0-2
Chickens	0-2	2-5	5-10	10-20	0-30
Other productive assets	None	Hand hoe Axe	Ox plough	Ox plough Ox cart Bicycle	Ox plough Ox cart Bicycle
Other reasons for differences in wealth	Limited labour	Limited labour Lack of assets	Limited labour Lack of assets Family size		
Main sources of cash income	Casual labour Chicken sales Grass cutting Handicrafts	Brewing Chicken sales Grass cutting Crafts	Brewing Chicken sales Vegetable sale Sale of wild foods	Brewing Charcoal Livestock sales Sale of cotton, maize	Livestock sales Sale of cotton, maize

Table 2 compares: i) the results of the key informant ranking of households into wealth groups; and ii) a ranking of households based on actual records of the household assets identified in the HEA community interview (area cultivated, vegetable sales, livestock holdings, bicycle, ox-cart and plough ownership, income from brewing, handicrafts and charcoal burning). The result shows:

- A moderately good relationship between the wealth group membership estimated by the key informant and that derived from recorded asset holdings: 50% of the ranks are the same. The agreement is best at the extremes of the distribution.

- An erratic relationship between wealth group membership estimated by the key informant and the recoded income of individual households.

This tends to support the view that the community wealth ranking is actually asset based. However an explanation is required for the apparent contradiction between: i) the poor relationship between the key informant estimate of the wealth group of individual households and the estimated income of individual households; and ii) the relatively good quantitative relationship found between HEA and the ranked estimates of individual income in the reference year (ie HEA+ in Figure 4).

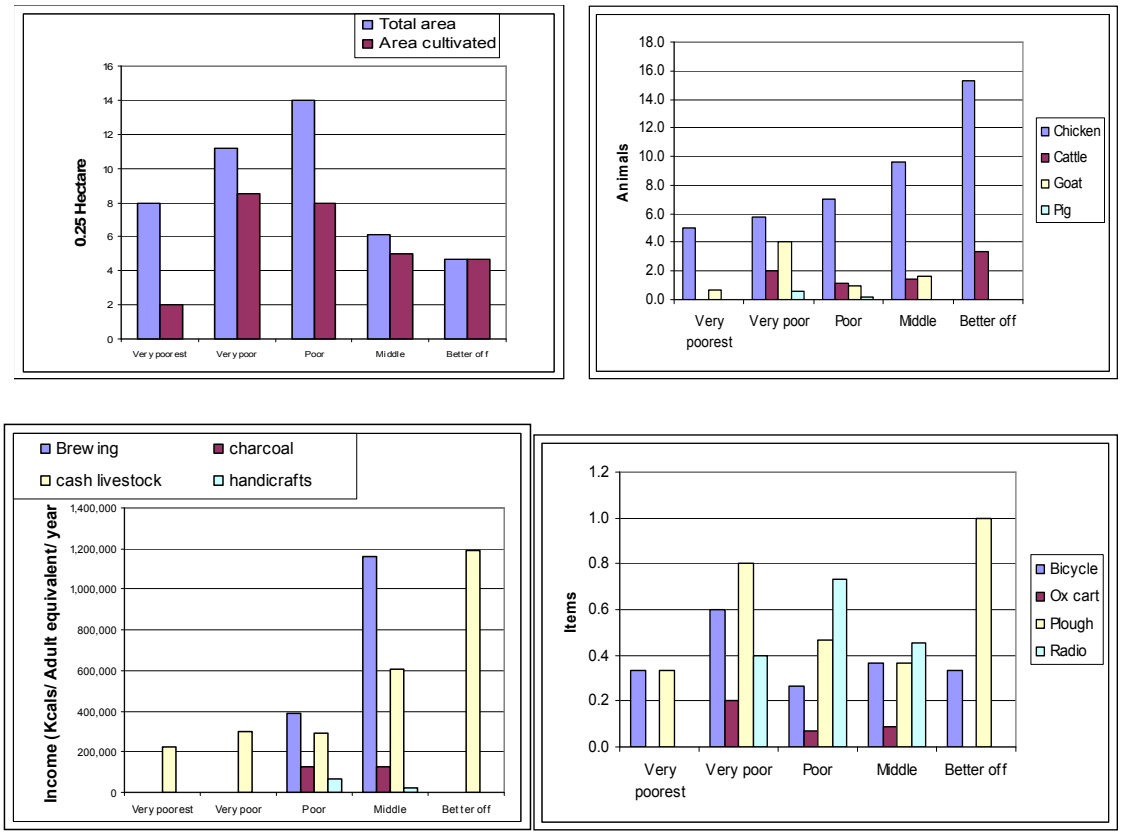
Table 2: Comparative rankings from asset holdings and by key informant

Estimated income 2005/06 from individual household interviews	Ranked from asset holdings	Ranked by key informant
1 (poorest)	Very poorest	Very poorest
2	Very poor	Very poor
3	Poor	Poor
4	Better-off	Better-off
5	Poor	Poor
6	Poor	Poor
7	Very poor	Better-off
8	Very poor	Very poor
9	Middle	Middle
10	Poor	Poor
11	Poor	Poor
12	Poor	Poor
13	Poor - Middle	Very poor
14	Poor	Middle
15	Very poor	Middle

16	Poor	Middle
17	Poor	Poor
18	Very poor	Poor
19	Very poor	Poor
20	Very poor	Poor
21	Very poor	Middle
22	Poor	Very poor
23	Poor	Middle
24	Middle	Middle
25	Poor	Better-off
26	Poor	Very poor
27	Very poor	Very poor
28	Poor	Very poor
29	Poor	Not ranked
30	Middle	Middle
31	Middle	Very poor
32	Poor	Poor
33	Poor	Better-off
34	Very poor	Very poor
35	Better-off	Better-off
36	Poor	Very poor
37(Richest)	Poor	Very poorest

Figure 6 shows the average asset holding recorded in the *individual* household interviews grouped according to the proportion of households and the wealth group characteristics established in the HEA community interview (the area cultivated, vegetable sales, livestock holdings, bicycle, ox-cart and plough ownership, income from brewing, handicrafts and charcoal burning).

Figure 6: Average values of individual household data grouped according to the proportion of households and the wealth group characteristics established in the HEA community interview



Clockwise from top left: i) household land holding and land cultivated; ii) household livestock holdings; iii) other asset holdings; iv) income from defined sources, in the reference year.

Excluding the 'very poorest' and the 'better-off' because: i) both groups are very small (N=3); and ii) two members of the HEA 'very poorest' wealth group are not represented in the IHM data set at all, Figure 6 shows a fair correspondence between the individual household income and asset holdings and occupations, the exceptions being:

- land holding and cultivated land, which is lower in the 'middle' group than in the 'poor' group. The reason for this is not known.

- bicycle, radio and plough ownership, which is more evenly distributed between wealth groups than expected from the community interview. However although this was not systematically recorded, some bicycles, ploughs and radios were broken, lacking oxen or batteries.

With those exceptions the' very poor', 'poor' and 'middle' wealth groups income does generally follow the asset criteria established in the community interview.

The apparent anomaly between the key informant/asset-based estimate of wealth group membership and recorded income appear to be accounted for by:

- Poor production in the reference year. This would to some extent de-link assets and income and potentially distort the income estimates from individual households. For example the richest individual household is a single 77 year-old woman with small land holding (0.5 hectare), and a modest agricultural income boosted by the sale of a cow. This household classifies as 'very poor'.

- Errors in the key informant ranking and/or errors in the individual household income data. For example household 7 in Table 2 is identified as 'better off' by the key informant and as 'very poor' in terms of asset holding and all other characteristics. The household is a single 80 year-old woman with a very small farming income. It is possible that because of the splitting of households to meet food aid criteria she was in fact part of a larger richer household although it appears more likely from the information obtained in the individual interview that this was a key informant error.

For completeness, the possibility has been examined that the ranking of households relative to their wealth group was affected by:

- The key informant using the criterion of gross household wealth/income rather than income per person (HEA).

- Distortions arising from food aid (although this was received by thirty (81%) of households) (Figure 8).

- The omission of significant sources of income from the HEA definition of wealth which were recorded in the individual household income estimates. These include gifts and remittances other than food aid (received by 30% of household(N=11)), one household receiving a pension and a 'vulnerable group' ration in addition to a 'take home' ration (amounting together to nearly one ton of cereals/year), specialist occupations (volunteer teachers who receive a small stipend) and a blacksmith/carpenter (Figure 9).

Eliminating each of these in turn and reordering the households makes no appreciable difference to the relationship between household income and the key informant and asset-based wealth group ranking.

4 Conclusions

4.1 The study

Given the practical difficulties encountered with this study, the very small data set, and the use of an unsuitable reference year, the best that can be said is that the results are encouraging.

There is a close correspondence between the actual household income estimate in the reference year and the HEA+ model.

The findings also tend to support the reliability of the HEA data.

4.2 Information which can be derived from HEA+

HEA+ can be used to obtain estimates of (Figure 7):

- The proportion of poor households/people in each livelihood zone. In the illustration (Figure 7) the poor are defined as those below a standard of living threshold, ie the income level at which a person can meet their food energy needs and afford a defined set of other goods (soap, clothing, school costs etc). The standard of living threshold is equivalent to 1,082,089kcal or 299kg maize. 18% of the study population was estimated below the standard of living threshold in the reference year.

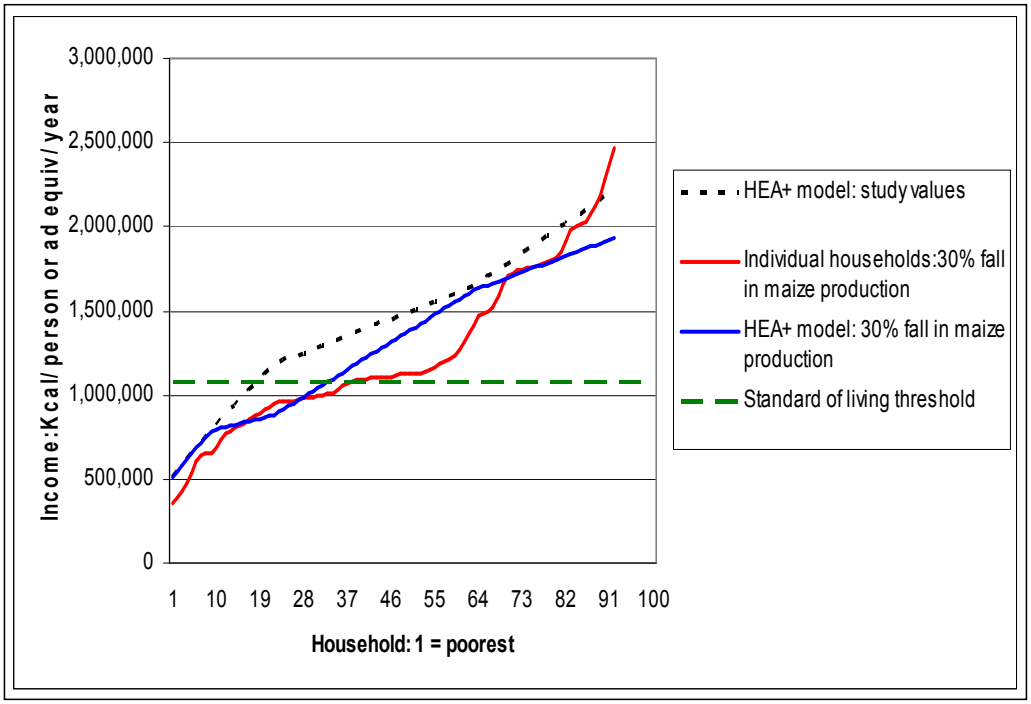
- The cost of bringing this population up to the standard of living threshold. Using the HEA+ model, which is shown for 100 households (Figure 7) the average deficit/person below the threshold = ZK79,000 at the prevailing maize price. The proportion of all people in deficit households (which tend to be smaller than average) is 9%. Extrapolated (arbitrarily) to a similar population of 100,000 the total estimated direct cost (ie not including administrative costs) of a CT programme which aims to bring this population up to the standard of living threshold would be approximately £97,000/year (£1=ZK7,000).

- Changes in poverty rates following changes in production, assistance and the price of traded goods. For example recalculating the HEA+ distribution with a 30% reduction in maize production increases the proportion of the population falling below the standard of living threshold to 33% (24% of all people). The average deficit falls to ZK68,000 (£10)/person in deficit/year. Extrapolating this

to a population of 100,000 would increase the direct cost from approximately GB£97,000/year to approximately £230,000/year. Estimates can be made in this way of any factor affecting production (eg input use), other sources of income (eg assistance in kind) or price changes. Calculation of the actual number of people requires census data.

- Information which may be useful to establish targeting criteria. Figure 7 shows the number of elderly people in each wealth group. Eight out of thirteen (62%) of elderly people in the study population live in households above the standard of living threshold.

Figure 7: Illustration of information that can be potentially derived from HEA+



Black dotted line: Income distribution (in kcal/person/year) estimated from HEA+.

Green broken line: the standard of living threshold, ie the income level at which a person can obtain sufficient food energy and can meet the cost of a defined set of other goods (soap, clothing, school fees etc). The 'better-off' group is not shown.

The area A (between the standard of living threshold and the reference income distribution) adjusted for household size, which varies between wealth groups) gives the estimated deficit.

Blue line: HEA+ values recalculated taking into account the fall in income which would result from a 30% fall in income. The reduced maize crop increases the proportion of

people below the standard of living threshold (HEA+ from 18% to 33% of households) (Area B between the standard of living threshold and the blue line).

The relatively modest change in income from a substantial fall in maize production (the principle crop) reflects: i) the large household income from food aid in the reference year; ii) an already reduced maize income in the reference year; and iii) that the 'very poorest' wealth group does not produce maize.

Red line: for comparison, individual household income (scaled to 100) with change resulting from 30% fall in maize production.

The relatively poor fit of the HEA+ and individual household estimates in the 'poor' and 'middle' groups is explained by the poor relationship found between some HEA characteristics and the actual income recorded from individual households, particularly across the middle of the income range.

The numbers below the line show the number of individuals over sixty years of age in each wealth group (derived in this case from the individual household data), who might be a target group for cash transfers. Eight of thirteen people (62%) over sixty years of age are in households above the standard of living threshold.

4.3 Cost, replication and scalability

Assuming that an HEA data set was being gathered or an existing data set was being updated, the additional cost of using the HEA+ model would be very low. On the experience of the pilot the HEA+ data set would add approximately 5-10% to the work required to gather a 'standard' HEA data set.

4.4 The next steps

A single small study is obviously insufficient to establish the validity of the proposed method and further experimentation is required. Further testing of the method would be most simply and economically done in a location where existing HEA data sets were already being updated. This would give a much larger HEA sample than was available in this study. Individual household income data could be obtained from an appropriate sample of households from the HEA sample sites, rather than from a single village. This may be possible in either Lesotho or Malawi where there are already national HEA data sets. However:

- Most countries already have a poverty measure (eg in Malawi there is a consumption measure).
- If HEA+ were used as a poverty measure there are outstanding questions about sampling. HEA uses purposive samples, ie sample sites are deliberately selected

within livelihood zones. For HEA this is the most suitable sampling method as: i) the information is used to develop predictive scenarios, ie logical arguments about the connection between a 'shock' (eg a fall in crop production) and future household food access. It is not a 'measurement' in the usual sense; and ii) a large amount of information is available on variation (eg in income sources) within livelihood zones before sample sites are selected. Most national measures use random sample designs.

It would therefore be important for further development of the method to be done in agreement and discussion with the relevant national agencies.

Figure 8: Income (kcal/household/year) from food assistance

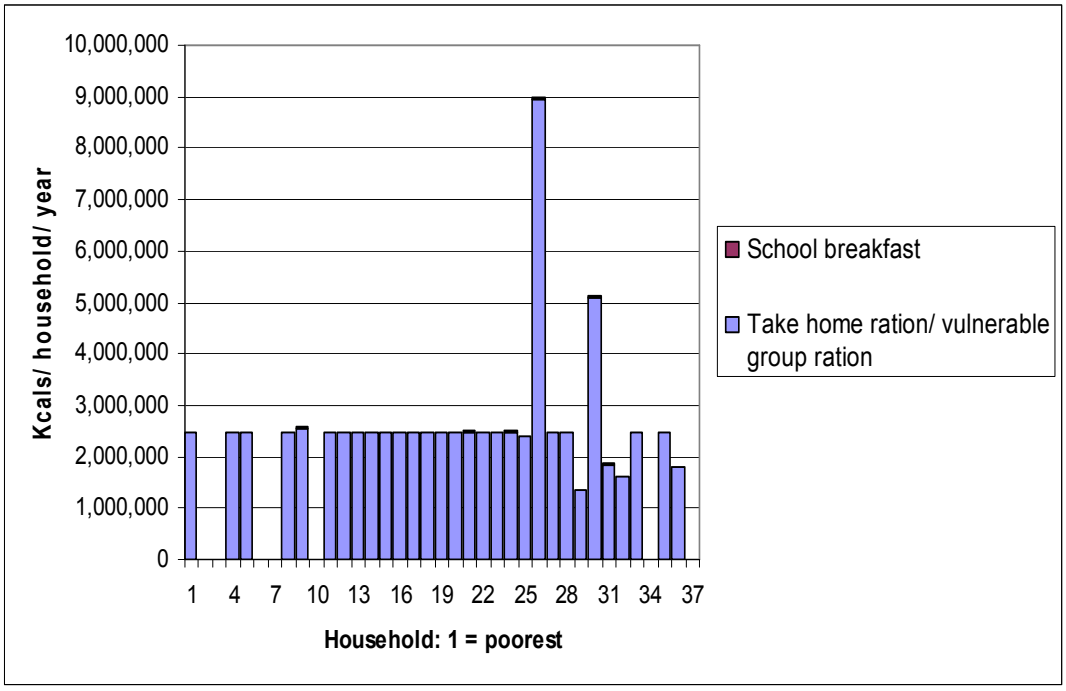


Figure 9: Pension and non-food aid gifts (kcal/household/year) and remittances (eg from kin working outside the village)

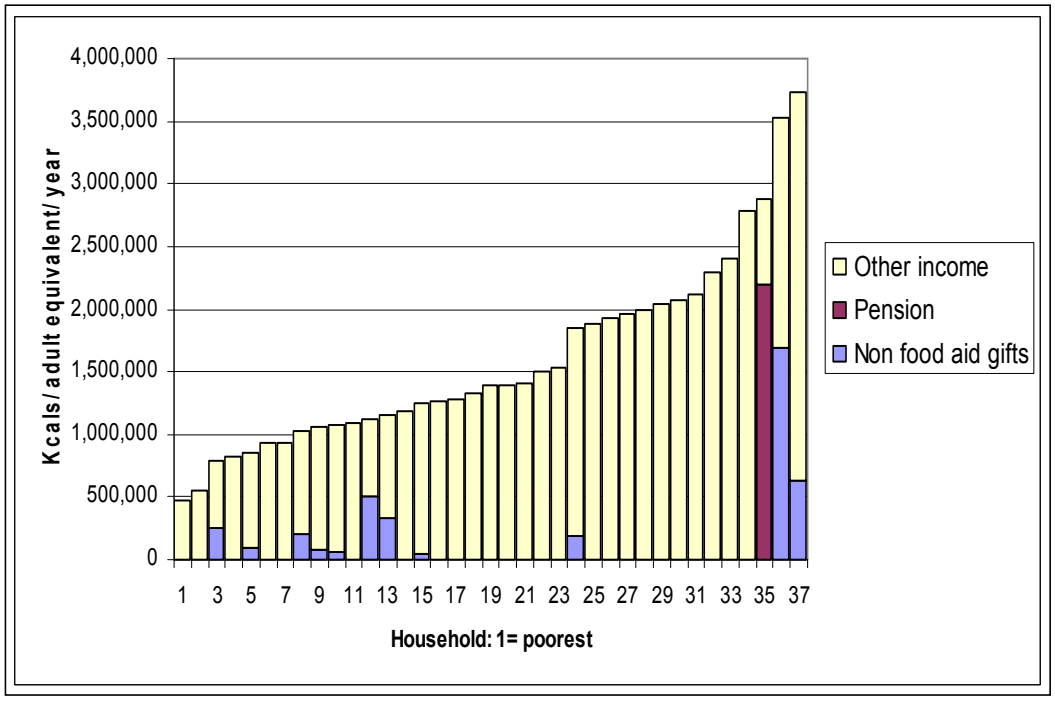
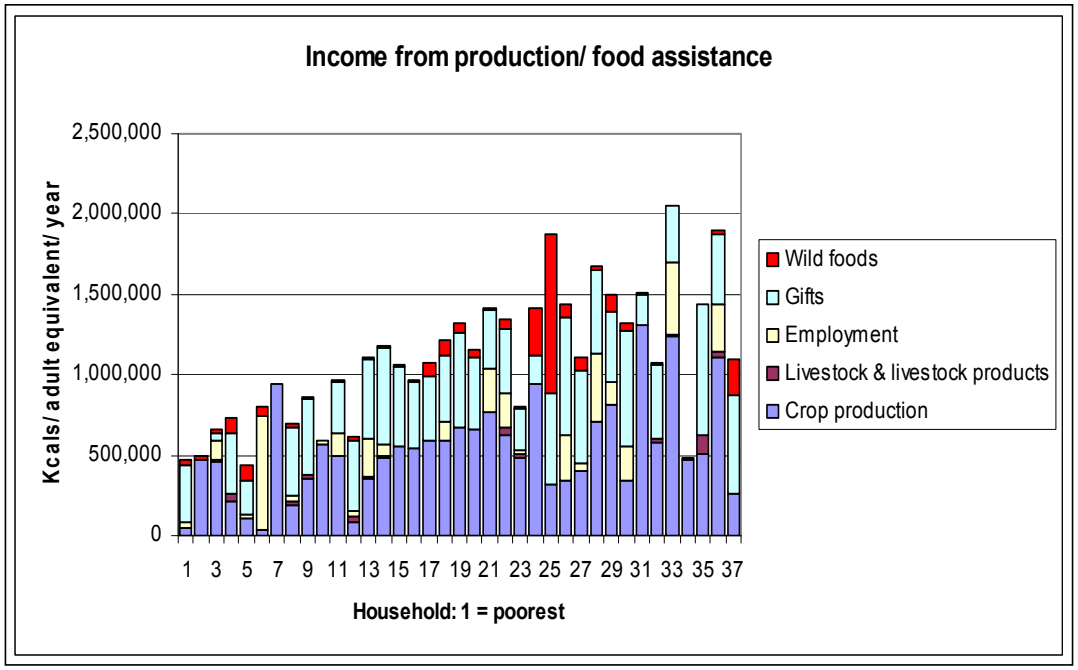
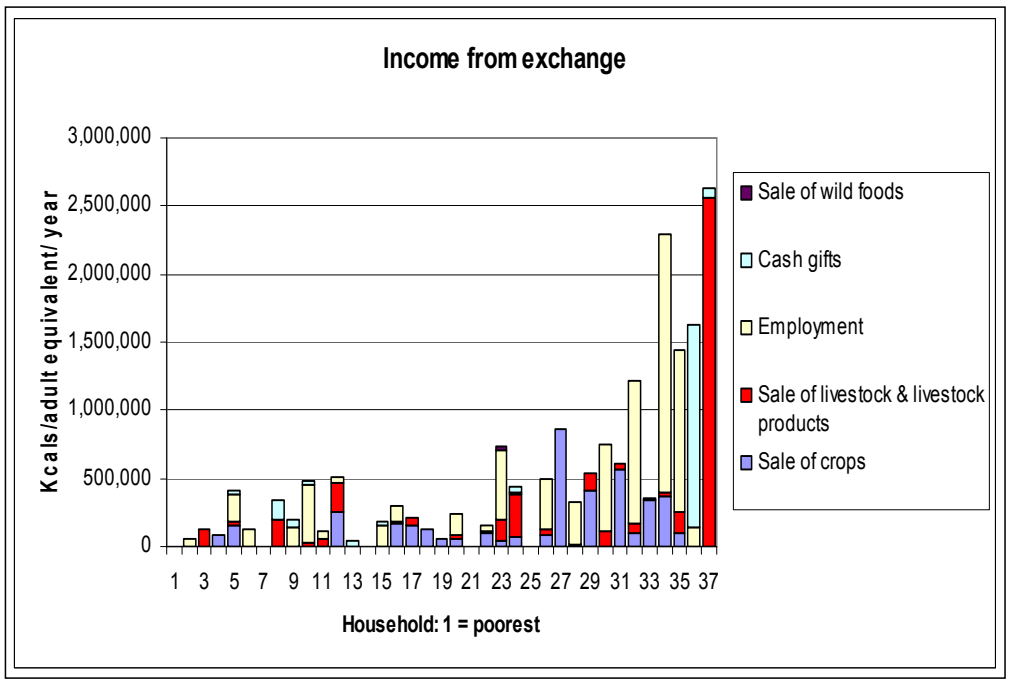


Figure 10: Household income from production and exchange (kcal/adult equivalent/ year)

Note that the value of cash gifts (eg remittances) has been included under exchange.




Income from exchange
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
Kcals/adult equivalent/ year
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37
Household: 1 = poorest
Sale of wild foods
Cash gifts
Employment
Sale of livestock & livestock products
Sale of crops

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Annex 1: Recording form used for HEA wealth groups

Interview Form 2: Wealth group interview form

Village:	Date:
Interviewer:	
Wealth group:	Number of participants in interview Men _____ Women _____

1. Household/Family size and composition

No. people in HH/family living/eating at home daily			

2. Land holdings and use

Land type	**Unit for measuring land**	**Land cultivated – food crops**	**Land cultivated – cash crops**

3. Livestock holdings

Type	**Number**

4. Do households in this wealth group own any other productive assets? eg bicycle, plough

Food and cash from crop and livestock production: Obtain quantified information on all food sources for a typical household in this wealth group in the reference year (remind participants of the specific year you are interested in). Food sources should fall into the following categories.

Own crop production

Crop (food crops, cash crops and vegetables)	Unit eg kg	Quantity produced	Quantity sold	Month sold	Price/ unit	Cash income	Quantity other use	Quantity consumed	% of HH food needs
Total food & cash income →									

Food item	Unit	Price/Unit	Total units purchased	% of HH food needs

Seasonal variation in staple food purchase. Indicate using numbers the approximate level of staple food expenditure in each month

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

Own livestock products (milk, meat, eggs)

Livestock product eg milk	Unit eg litre	Quantity produced	Quantity sold	Month sold	Price per unit	Cash income	Quantity other use	Quantity consumed	% of HH food needs
Total food & cash income →									

5. Other sources of food:

Labour exchange: payment in cash & food

Commodity	Quantity received	Unit	Price/unit	Quantity sold	Cash income	Quantity other use	Quantity consumed	% of HH food needs
Total food & cash income →								

Relief (dry and wet rations)

Commodity	Quantity received	Unit	Price/ unit	Quantity sold	Cash income	Quantity other use	Quantity consumed	% of HH food needs
Total food & cash income →								

Gifts (e.g. from kin) and loans

Commodity	Quantity received	Unit	Price/ unit	Quantity sold	Cash income	Quantity other use	Quantity consumed	% of HH food needs
Total food & cash income →								

Wild foods, fish and game

Commodity	Quantity	Unit	Price/ unit	Quantity sold	Cash income	Quantity other use	Quantity consumed	% of HH food needs
Total food & cash income →								

Other (e.g. use of stocks)

Commodity	Unit	Quantity	Total units	% of HH food needs
Total food income →				
TOTAL SOURCES OF FOOD →				

6. Other sources of cash income: e.g. paid labour, remittances, rental income.

Income source	***Typical Annual Amount Earned***				
	Quantity sold [a]	**Frequency sold [b]/month**	**Months sold**	**Price per unit [c]**	**Total income by source [a] x [b] x [c]**
TOTAL SOURCES OF CASH INCOME →					

7. Non- food expenditure & non staple food expenditure:

Expenditure Categories	*Non-food expenditure for the month of (insert month)*_____			
	Quantity (unit) purchased [a]	**Frequency purchased [b]**	**Current price per unit [c]**	**Total = [a] x [b] x [c]**
Fuel e.g. paraffin				
Clothing				
Matches				
Utensils				
Soap				
School costs				

Health costs				
EXPENDITURE →				

Seasonal variation in level of expenditure. Indicate using numbers the approximate level of expenditure in each month

Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**

QUALITY OF INTERVIEW:

NOTES:

Annex 2: Recording form used for individual households

Individual Household Economy

Household #: Date:

Place: Interviewer:

Interviewee:

1. **Name of current household head**: Record the name they would use for 'official' purposes

2. Details of all household members: Include everyone who eats and sleeps here; also include 'part time' residents ie family members who work away for part of the year but contribute to household income. Record each person's relationship to household head.

Name	Year of birth	Tick if currently receives cash transfer	Relationship to household head	Full time or p/time resident	If part time, approx how many weeks present per year?

Name	Year of birth	Tick if currently receives cash transfer	Relationship to household head	Full time or p/time resident	If part time, approx how many weeks present per year?

3. Land: Include information for each plot

Type of land (e.g. upland, lowland)	Area of each plot	Area cultivated in the last agricultural year	What inputs were used?	Area rented out to others last year
1.				

2.				
3.				

4. Other assets: List any livestock including poultry

Livestock type	**Number**

List major assets (e.g. bicycle, plough, house for rental)

Asset	**Number**

5. Production : With the interviewee, make a sketch of their plot/s and indicate the size of plot/s, crops grown and quantity produced in the last full agricultural year . Use the blank sheet provided and indicate Season 1/ Season 2 where relevant. Indicate crops grown and quantity produced. Fill in the following table, indicating total production, amount sold, amount consumed and other uses.

Crop	Total Production	Amount sold	Amount consumed	Other e.g. given away, saved for seeds etc

Trees	**Number**	**Approx yield**	**Kg sold**	**Approx kg consumed**

6. Livestock and livestock products. Include all livestock and poultry

Animal	**Number**	**Milk consumed**	**Milk sold**	**Meat consumed**	**Live sales**	**Eggs consumed**	**Eggs sold**	**Other**

7. Wild foods Is any wild food collected? Include total kg consumed and sold

Food: name and if necessary describe type of food eg dark green leaves	**Total kg sold per year**	**Total kg consumed per year**	**Other comments**

8. Other sources of food Is any food gained by children or others eg gleaning after the harvest; begging etc.

Food	**Total kg consumed per year**	**Other comments**

9. Employment: List all sources of employment, for each household member.

Month	Work	Who?	How many days/month?	Total value of work/month

Month	Work	Who?	How many days/month?	Total value of work/month

Month	Work	Who?	How many days/month?	Total value of work/month

Month	Work	Who?	How many days/month?	Total value of work/month

10. Remittances/migrant work:

Age	Sex	Relation-ship to h'hold	Occupation	What contribution do they make to the household?	How often do they visit and how long for?

11. Gifts: Include all sources including relief, support from relatives who are not part of the household, neighbours etc

Source of assistance: relative, NGO, neighbour, church etc	Type of assistance	Quantity: total kg food or cash per year	Other information

12. Other sources of income e.g. from property rental, company pensions, other employment benefits etc

Source of income/benefit	Value per year	Other information

13. Credit and loans

Source of credit	Repayment per month:	Interest rate	Other information