

Assessing Rural Transformations in Karonga district, Malawi: IHM evidence

Evidence for Development working paper 4



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Assessing the impact of their interventions in the context of rapid social and economic transformations is a major challenge for agencies involved in rural development. The Assessing Rural Transformations (ART) project was designed to address this challenge and investigate practical and credible ways of assessing the impact of development activities. Two approaches were used: the Qualitative Impact Assessment Protocol (QUIP), a tool for self-reported attribution, and the Individual Household Method (IHM), a relatively new approach to measuring and monitoring income at household level.

The IHM allows users to disaggregate and quantify the contribution made by specific project activities to a household's overall economic status and its capacity to access the goods and services required for social inclusion and well-being. It is a tool that can be used to track change at household level and to gain insights into the drivers of change. This information can be used as a guide for further investigations using the most appropriate methodologies, making it an ideal tool for use in the ART project.

This is the fourth IHM working paper from the ART project, looking at the 'Developing Innovative Solutions with Communities to Overcome Vulnerability (DISCOVER)' project in Karonga district, in the north of Malawi. The project, a major consortium initiative to reduce vulnerability to climate change, aims to promote greater food security and strengthen resilience to climate change by introducing improved agricultural practices, promoting alternative crops and providing better access to seeds. In addition to working directly with farmers, the project aims to strengthen local capacity to respond at every level by including local government decision makers, extension workers and community leaders in its activities.

Research protocol

A series of IHM studies were carried out between 2012 and 2015 in two selected villages participating in the DISCOVER project, to track changes in beneficiary and non-beneficiary households, and to gain a deeper understanding of project impacts and the drivers of change among smallholder farmers in the project area. The individual household method (IHM) was used to collect information on household incomes and economies.



The research protocol described in *Assessing Rural Transformations in Oromia, Ethiopia: IHM evidence*¹ was followed. Teams were led in the field by experienced IHM practitioners (IHM levels III and IV) who had been trained by Evidence for Development (EfD)². EfD was responsible for the overall direction of the work and for final data checking and analysis.

Location and sampling

The studies were conducted in two Karonga district villages that were participating in the DISCOVER project and purposively chosen to reflect variation within the project area.

Karonga has been identified as one of Malawi's most disaster-prone districts, experiencing increasingly erratic rainfall and seasonal flooding. Both study villages are located in the Central Karonga livelihood zone³. The main crops grown in this zone are maize, groundnuts, sweet potatoes, rice and vegetables. The main hazards are dry spells alternating with floods. Flooding and waterlogging wash away crops and cause tubers to rot, and dry spells during maize tasselling in February and March affect cob formation and consequently reduce yields. Pests such as army worms also affect maize production.

In the first village, close to the shore of Lake Malawi and approximately 19 km from Karonga town, soil conditions vary considerably: some plots are extremely fertile, while others are sandy, dry and degraded. Most households have access to *dimba* wetland, where conditions are suitable for cassava (which is consumed fresh or dry throughout the year). Some households also have access to seasonally-flooded wetlands, suitable for growing rice as well as a second (winter) maize crop. The second site lies inland to the west of Lake Malawi, on the boundary of the Nyika National Park and about 30 km from Karonga town. Rivers from the national park flow through the area, resulting in frequent flooding which affects both property and livestock. It is a mainly maize- and millet-growing area, with the seasonally-flooded dimba land providing excellent conditions for vegetable production.

In order to complete the work within the available timeframe and budget, it was necessary to base the work in Karonga on random samples in the selected villages. In both villages, beneficiaries were either self-selected after the proposed intervention was explained in community meetings, or were selected by community leaders on the basis of interest and perceived ability to benefit from the initiative. Information on village size provided before the teams went into the field in 2012 proved to be inaccurate, with one of the randomly-selected villages being far smaller than the original official estimate. Rather than take a random sample of equal size from both villages, it was therefore decided to include all beneficiary households plus 50% of non-beneficiaries in the smaller village, and all beneficiaries plus 30% of non-beneficiaries in the larger village.

¹ Petty, C. & Ellis, W. (2015a) *Assessing Rural Transformations in Oromia, Ethiopia: IHM evidence*, Evidence for Development working paper 1. Available online at <u>http://www.efd.org/reports/assessing-rural-transformations-in-oromia-ethiopia-ihm-evidence/</u>

² For more details of Evidence for Development, see: <u>http://www.efd.org/</u>

³ *Malawi Baseline Livelihood Profiles* (2005), Famine Early Warning Systems Network (FEWS NET). Available online at <u>http://www.fews.net/southern-africa/malawi/livelihood-baseline/november-2009</u>



Data collection

Preliminary data was collected from focus groups and key informants at the study sites to establish an overview of the local economic and social context. These interviews were repeated for each subsequent round of data collection to update prices and record major events, such as adverse weather conditions. Detailed village maps were drawn on the first visit, showing all households and the names of their household heads. These were checked on subsequent surveys and any changes noted.

The selected households in the study villages were interviewed following the IHM protocol described in EfD working paper 1⁴. Field workers were trained to cross-question and probe during the interview, drawing on the information collected in contextual interviews and their own observations (for example, if they see fishing tackle around the house and no mention is made of fishing, they should ask who uses the tackle). Where information is unclear or appears contradictory, interviewers are encouraged to engage in an active dialogue with respondents.

Interview data is checked on return from the field and entered on spreadsheets generated by the open-IHM software, uploaded into the project database and preliminary results are reviewed. Where there are obvious errors, forms are cross-checked and, if necessary, households are revisited the following day to resolve queries and collect missing data.

IHM concepts and terminology

In the analysis here, income produced or received by the household as food for their own consumption is classified as 'food income', measured in kcal and distinct from 'cash income', measured in the local currency. Software designed by Evidence for Development calculates the proportion of the household's total food energy requirement⁵ met by its food income and the cost of purchasing the outstanding requirement, based on the mid-year market price of the most commonly consumed local staple foods. Any money remaining from the household's cash income after it has purchased this food is described as 'disposable income' (DI):

Disposable income =

Sum of all household cash income – ((Household food energy requirement [kcal] – Sum of all household food income [kcal]) × Price per kcal of staple diet)

Households that do not have sufficient income to meet their WHO reference standard food energy requirement are considered to be below the food poverty line and to have a negative disposable income. To allow for comparison between households of different size and demography, income is

⁴ Petty, C., & Ellis, W., op. cit.

⁵ Food energy requirements derived from 1985 WHO reference standards: 'Energy and protein requirements', *Report of a Joint FAO/WHO/UNU Expert Consultation* (1985), World Health Organization Technical Report Series 724. Available online at http://www.fao.org/docrep/003/aa040e/aa040e00.HTM



further standardised by 'adult equivalent'⁶, giving disposable income per adult equivalent (DI/AE). Figures that are not standardised per adult equivalent may be described as 'raw'.

A '**standard of living threshold**' (SoLT) was set for the locality, representing the cost of a basket of essential items that are required to meet the local norms for social inclusion. When calculating each household's cost of meeting the standard of living threshold, personal costs (such as clothes, primary school costs, etc.) are allocated according to the age and gender of individuals in the household; other costs such as fuel are allocated per household. Households that cannot afford the full set of items are described as being 'below the standard of living threshold'.

In each year data was collected for twelve-month periods, covering the most recent local 'agricultural year'. The individual household method and concepts used in IHM analysis are described in more detail in EfD working paper 1⁷.

Findings

This report compares data from the 2013 baseline and 2015 endline studies, relating to the agricultural years March 2012 – February 2013 and March 2014 – February 2015. Although the project's start date was in 2012, full implementation did not begin until 2013 and so we have only included data from households interviewed in both of the 2013 and 2015 study in this analysis. However, useful contextual information was collected in the 2012 assessment, which was also an opportunity to train new project staff in IHM data collection.

The DISCOVER project includes a range of different interventions received by different households at different points in the project cycle. The livelihoods project in Tigray, Ethiopia⁸ also covered in these ART working papers was also similarly complex, in contrast to the relatively more homogenous groundnut and soya project in central Malawi⁹ and the malt barley project in Oromia, Ethiopia¹⁰. Other factors to consider in analysing project impacts include the relatively short timeframe within which changes were being tracked.

In the larger village, some beneficiary households received rice and/or maize seeds in the fourth quarter of 2012 before being revisited and encouraged to repay the seeds they received in the second quarter of 2013. Effects of these rice and maize seeds could appear in household data

⁶ The number of adult equivalents per household is calculated as the total household energy requirement divided by the energy requirement of a young adult (2,600 kcal per day).

⁷ Petty, C., & Ellis, W., op. cit.

⁸ Petty, C. & Ellis, W. (2015c) *Assessing Rural Transformations in Tigray, Ethiopia: IHM evidence*, Evidence for Development working paper 1. Available online at <u>http://www.efd.org/reports/assessing-rural-transformations-in-tigray-ethiopia-ihm-evidence/</u>

⁹ Petty, C. & Ellis, W. (2015b) *Assessing Rural Transformations in Lilongwe district, Malawi: IHM evidence*, Evidence for Development working paper 2. Available online at <u>http://www.efd.org/reports/assessing-rural-transformations-in-lilongwe-district-malawi-ihm-evidence/</u>

¹⁰ Petty, C. & Ellis, W. (2015a) Assessing Rural Transformations in Oromia, Ethiopia: IHM evidence, Evidence for Development working paper 1. Available online at <u>http://www.efd.org/reports/assessing-rural-transformations-in-oromia-ethiopia-ihm-evidence/</u>



towards the end of the period covered by the baseline year (March 2012 – February 2013). In the first quarter of 2014, some of these 2012 beneficiary households and an additional group of new beneficiary households received rice and/or sweet potato seeds, and in the fourth quarter of 2014 further distributions of rice seeds were made. These crops were all harvested in time for their effects to appear in the endline data (March 2014 – February 2015)

In the smaller village, interventions included distributions of maize seed and a small number of beehives. The baseline year (March 2012 – February 2013) would include income from these interventions. Several households received rice and sweet potato seeds in the first quarter of 2014, with further rice seeds distributed in the fourth quarter of 2014. Income from these interventions would appear in the endline data (March 2014 – February 2015). Goats and a natural resource management forestry intervention were introduced in the first quarter of 2015, but this was too late for any effects to feature in the endline data.

In the analysis that follows, we only include households for which there is both baseline and endline data and where careful data checking indicated that there were no irregularities. Of the original 50 households surveyed in the 2013 baseline, 12 could not be traced on return visits in 2015: further enquiry indicated that these households had either moved, combined with another household, left the area, or dispersed following the death of the household head. A further 20 households could not be used as their data was incomplete in either the baseline or endline year and could not be followed up within the project timeframe. This left 18 households for inclusion in the analysis. This is an unusually high rate of attrition for IHM studies, with lessons for future planning and data checking.

Beneficiary crops & timings	Total no. of HHs	'Beneficiary types' for analysis	
Non-beneficiary	5	Non-beneficiary	
Y1 maize	1	Maize beneficiary	
Y1 rice	2	Rice beneficiary	
Y1 maize; Y2 rice	4	Maize & rice beneficiary	
Y1 maize & rice; Y3 rice	1	Maize & rice beneficiary	
Y1 maize & rice; Y3 sweet potato	1	Maize, rice & sweet potato beneficiary	
Y1 maize & rice; Y3 rice & sweet potato	2	Maize, rice & sweet potato beneficiary	
Y3 sweet potato	1	Sweet potato beneficiary	
Y3 rice & sweet potato	1	Rice & sweet potato beneficiary	

Table 1: Variation in project interventions

Of the 18 households included here, 12 are from the larger village and 6 from the smaller village. There are 5 non-beneficiary households, and 13 households that were beneficiaries at some point(s) in the project – Table 1 shows fuller details of the crops and timings of the different interventions received by these households (in the first column), to the left of the seven 'beneficiary types' into



which the original nine categories are grouped for some of the analysis here. These households do not include any beekeeping beneficiaries.

Income distribution and standard of living

One of the households fell below the food poverty line in the baseline year (Fig. 1), and 4 others had disposable incomes of less than 13,000 kwacha per adult equivalent. Only 11% of the sample (2 out of 18 households) fell below the standard of living threshold (Table 2); these households also had the two lowest disposable incomes.



Figure 1: Baseline disposable income per adult equivalent

Baseline DI/AE (Y1), beneficiary households Baseline DI/AE (Y1), non-beneficiary households

Overall, beneficiaries in the first year were spread relatively evenly across the disposable income distribution, with slightly more better-off households included in the beneficiary group. Numbers of households from the different beneficiary types are too small to draw conclusions from their respective positions.

The beneficiary households' median baseline disposable income was 36,044 kwacha per adult equivalent. This was almost twice as high as the non-beneficiaries' median 19,790 kwacha per adult equivalent. However, the 2 households below the standard of living threshold were both beneficiary households (one 'rice beneficiary' and one 'maize and rice' beneficiary).

	DI/AE tercile			Overall
	1 (poorest)	2	3 (richest)	Overall
% of HHs below SoLT	33.33%	0.00%	0.00%	11.11%
(no. in parentheses)	(2/6)	<i>(0/6)</i>	<i>(0/6)</i>	(2/18)
% of HHs above SoLT	66.67%	100.00%	100.00%	88.89%
(no. in parentheses)	(4/6)	(6/6)	(6/6)	(16/18)
% of HHs beneficiaries	50.00%	66.67%	66.67%	61.11%
(no. in parentheses)	<i>(3/6)</i>	(4/6)	(4/6)	(11/18)
% of HHs maize benef.	0.00%	0.00%	16.67%	5.56%
(no. in parentheses)	<i>(0/6)</i>	<i>(0/6)</i>	<i>(1/6)</i>	(1/18)
% of HHs rice benef.	33.33%	0.00%	0.00%	11.11%
(no. in parentheses)	(2/6)	<i>(0/6)</i>	<i>(0/6)</i>	(2/18)
% of HHs maize & rice benef.	16.67%	50.00%	16.67%	27.78%
(no. in parentheses)	<i>(1/6)</i>	<i>(3/</i> 6)	<i>(1/</i> 6)	(5/18)
% of HHs maize, rice & s. pot.	0.00%	16.67%	33.33%	16.67%
benef. (no. in parentheses)	<i>(0/6)</i>	<i>(1/6)</i>	<i>(2/6)</i>	(3/18)

Table 2: Baseline percentages of households above and below the standard of living threshold and beneficiary households, by quintile¹¹

The two households that became beneficiaries between the baseline and endline years – and are therefore shown here as non-beneficiaries – were the third-poorest ('sweet potato beneficiary') and seventh-poorest ('rice and sweet potato beneficiary') in the baseline disposable income distribution.

Baseline to endline changes

To compare baseline data (March 2012 – February 2013) with endline data (March 2014 – February 2015), all cash values in the endline data were adjusted (downwards) for inflation, with compound inflation rates derived from the Malawian National Statistical Office's rural consumer price indices¹². From these calculations, rural year-on-year inflation for March 2013 – February 2014 in Malawi was approximately 23.41%, and the equivalent figure for March 2014 – February 2015 was 19.60%. The compound inflation rate for these two years is 47.60%.

¹¹ This table and Fig. 1 only include households as 'beneficiaries' if they were beneficiaries in the baseline year, i.e. not counting the two households (classified as 'Sweet potato beneficiary' and 'Rice and sweet potato beneficiary' in Table 1) that became beneficiaries in the endline year.

¹² March 2012 – December 2012 inflation rates: 'Consumer Price Index Rural', National Statistical Office (2015). Available online at http://www.nsomalawi.mw/latest-publications/consumer-price-indices/69-consumer-price-index-rural.html January 2013 – December 2013 inflation rates: 'Consumer Price Index Rural 2013', National Statistical Office (2015).

Available online at <u>http://www.nsomalawi.mw/latest-publications/consumer-price-indices/198-consumer-price-indiex-rural-2013.html</u>

January 2014 – February 2015 inflation rates: 'Consumer Price Index Rural 2015', National Statistical Office (2015). Available online at: <u>http://www.nsomalawi.mw/latest-publications/consumer-price-indices/206-consumer-price-indiex-rural-2014.html</u>



Disposable incomes

Fig. 2 and Table 3 show the baseline (Y1) and endline (Y3) disposable income distributions and the proportions of households above and below the standard of living threshold. Note that while the same 18 households are shown for both years, their income percentiles and quintiles vary between the years. Fig. 2 and Table 3 therefore show changes at an aggregate level within the sample, rather than an individual household level. Data showing the changes to individual households' disposable incomes is presented in Fig. 3.



Figure 2: Baseline and endline disposable income distributions

For all but the poorest household in each year, disposable incomes were lower at all points of the distribution in the third, endline year (Fig. 2). Similarly, far fewer households were able to meet their basic food and non-food needs in the endline year, with the proportion of households below the standard of living threshold (Table 3) quadrupling from 11% (2 out of 18) to 44% (8 out of 18). Meanwhile, one household was below the food poverty line in each year.

Overall the beneficiary households' relative positions within the disposable income distribution worsened slightly between the baseline and endline years – with one more household in each of the poorest and middle terciles, but no change in numbers in the better-off tercile. Of the 2 new beneficiary households, the 'sweet potato' beneficiary moved from the poorest tercile to the richest, but the 'rice and sweet potato' beneficiary fell from the middle tercile to the poorest.

Table 3: Baseline and endline percentages of households above and below the standard of living threshold and beneficiary households, by quintile¹³

		[
		1 (poorest)	2	3 (richest)	Overall
% of HHs below SoLT (no. in parentheses)	Y1	33.33% (<i>2/6</i>)	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	11.11% (2/18)
	Y3	100.00% <i>(6/6)</i>	33.33% (2/6)	0.00% <i>(0/6)</i>	44.44% (8/18)
% of HHs above SoLT (no. in parentheses)	Y1	66.67% (4/6)	100.00% <i>(6/6)</i>	100.00% <i>(6/6)</i>	88.89% (16/18)
	Y3	0.00% <i>(0/6)</i>	66.67% (4/6)	100.00% <i>(6/6)</i>	55.56% (10/18)
% of HHs beneficiaries (no. in parentheses)	Y1	50.00% <i>(3/6)</i>	66.67% <i>(4/6)</i>	66.67% (4/6)	61.11% (11/18)
	Y3	66.67% (4/6)	83.33% <i>(5/6)</i>	66.67% <i>(4/6)</i>	72.22% (13/18)
% of HHs maize beneficiaries (no. in parentheses)	Y1	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	16.67% <i>(1/6)</i>	5.56% (1/18)
	Y3	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	16.67% <i>(1/6)</i>	5.56% (1/18)
% of HHs rice beneficiaries (no. in parentheses)	Y1	33.33% (2/6)	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	11.11% (2/18)
	Y3	0.00% <i>(0/6)</i>	33.33% <i>(2/6)</i>	0.00% <i>(0/6)</i>	11.11% (2/18)
% of HHs maize & rice beneficiaries (no. in parentheses)	Y1	16.67% <i>(1/6)</i>	50.00% <i>(3/6)</i>	16.67% <i>(1/6)</i>	27.78% (5/18)
	Y3	33.33% (2/6)	33.33% <i>(2/6)</i>	16.67% <i>(1/6)</i>	27.78% (5/18)
% of HHs maize, rice & sweet potato beneficiaries (no. in parentheses)	Y1	0.00% <i>(0/6)</i>	16.67% <i>(1/6)</i>	33.33% (2/6)	16.67% (3/18)
	Y3	16.67% <i>(1/6)</i>	16.67% <i>(1/6)</i>	16.67% <i>(1/6)</i>	16.67% (3/18)
% of HHs sweet potato beneficiaries (no. in parentheses)	Y1	16.67% <i>(1/6)</i>	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	5.56% (1/18)
	Y3	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	16.67% <i>(1/6)</i>	5.56% (1/18)
% of HHs rice & sweet potato beneficiaries (no. in parentheses)	Y1	0.00% <i>(0/6)</i>	16.67% <i>(1/6)</i>	0.00% <i>(0/6)</i>	5.56% (1/18)
	Y3	16.67% <i>(1/6)</i>	0.00% <i>(0/6)</i>	0.00% <i>(0/6)</i>	5.56% (1/18)

As a whole, median beneficiary disposable income per adult equivalent dropped from 36,044 kwacha in the baseline to 12,949 kwacha in the endline, with the non-beneficiaries' median DI/AE

¹³ Unlike Table 2, the households shown as 'beneficiaries' in 'Y2' of Table 3 (this table) include 2 households that became beneficiaries of the 'sweet potato' or 'rice & sweet potato' interventions in the third year. Although these 2 households are not shown as beneficiaries in 'Y1' of the table, their quintiles for both years are shown (partly in grey) in the 'sweet potato beneficiaries' and 'rice & sweet potato beneficiaries' sections at the bottom of the table.



falling far less steeply from 19,790 kwacha to 15,923 kwacha. However, the beneficiaries' median change in DI/AE was a smaller reduction (-11,227 kwacha) than was the case for the non-beneficiaries (-20,233 kwacha).

At an individual household level, there were many fluctuations in disposable income between the baseline and endline years (Fig. 3). The disposable incomes of 62% (8 out of 13) of the beneficiary households decreased, alongside 80% (4 out of 5) of the non-beneficiary households' DI/AEs.



Figure 3: Baseline and endline disposable incomes by household¹⁴



■ Y1 DI/AE ■ Y3 DI/AE (inflation-adjusted)

With one falling and one rising, the median DI/AE of the two 'rice beneficiaries' increased from 11,107 kwacha to 16,560 kwacha, while the 'maize beneficiary' household and the new 'sweet potato beneficiary' household also increased their DI/AEs. The DI/AE of the new 'rice and sweet potato beneficiary' household fell, however, as did the median DI/AEs of the 'maize and rice

¹⁴ Beneficiary households indicated by a label on the *x* axis showing their beneficiary type. Again, as in 'Y2' of Table 3 (but unlike in Fig. 1 or Table 2), the two households that became beneficiaries of the 'sweet potato' or 'rice & sweet potato' interventions in the third year are shown here as beneficiaries.



beneficiaries' (from 27,404 kwacha to 9,026 kwacha) and the 'maize, rice and sweet potato beneficiaries' (steeply, from 70,735 kwacha to 16,087 kwacha).

The household with the largest decline in disposable income between the baseline and endline year was the richest in the baseline. This 'maize, rice and sweet potato' beneficiary household was a young couple who had a baby (adding to their total food energy requirements) in the intervening period, during which the main change in their income was moving from selling fish and rice and hiring out a bicycle in the first year to far less lucrative agricultural labour (weeding and harvesting) in the third year.

The only household to rise above the standard of living threshold between the baseline and endline years was one of the 2 'rice beneficiaries'; this household was the second-poorest in the baseline year. In contrast, the household that newly became a 'rice and sweet potato beneficiary' in the endline year fell below the standard of living threshold in the endline year (after being above it the baseline) – as did 60% (3 out of 5) of the 'maize and rice beneficiaries', and 1 (33%) of the 3 'maize, rice and sweet potato' beneficiaries. 2 (40%) of the 5 non-beneficiary households also newly fell below the standard of living threshold, while there were no changes around this threshold for the 'maize beneficiary' household or the 'sweet potato beneficiary' household, both of which remained able to meet their food and non-food needs.

Project-related income sources

Looking at the specific income sources underlying households' disposable incomes, the crops chosen for project interventions made varying contributions to beneficiary households' total food incomes (Fig. 4). For all beneficiaries, median 'raw' consumption of these crops¹⁵ per household fell from 1,583,600 kcal in the baseline to 1,116,600 kcal in the endline, a decrease roughly equivalent to 128 kg of maize. However, there were equal numbers of beneficiary households with increases and decreases in project-related food income (6 out of 13, or 46%) and the median proportion of total food income for which this accounted remained more or less constant (rising slightly from 59% to 61%¹⁶), with reductions overall in other food income sources.

The median food income from project-related sources of the 'maize, rice and sweet potatoes' households also fell (from 1,712,460 kcal to 1,087,540 kcal), but with an increase for one household that was larger than the combined decreases of the other two. The 'rice and sweet potato beneficiary' (which became a beneficiary in the endline year) increased its project-related food income from 637,200 kcal to 1,274,400 kcal, and there were also increases for the 'maize and rice beneficiaries' (median 1,996,000 kcal to 2,524,130 kcal) and the 'rice beneficiaries' (median 204,435 kcal to 414,180 kcal).

¹⁵ Including all crops for which beneficiary households received project interventions, at any point over the three years that was in time for any additional income linked to the project to appear in endline data.

¹⁶ These medians include the 0 kcal and 0% from the sweet potato beneficiary.





Figure 4: 'Project-related' and 'other' food income¹⁷

In the larger village, NGO staff noted that in the baseline year the rice crop was hindered by late distribution of seeds as well as damage from pests and livestock, but that it was more successful in later years. In the endline year, sweet potato and rice production suffered from dry spells and water shortages – with a stream on which farmers had depended changing its course to other villages.

In the smaller village, the baseline year's maize crop was considered successful despite water shortages and a late distribution of inputs, but sweet potatoes were badly affected by the dry spells – which also hindered rice production in the endline year.

¹⁷ Beneficiary households indicated by a label on the *x* axis showing their beneficiary type. Although some households were not beneficiaries at all in the baseline year or newly received interventions for a different crop in the endline year – and so their baseline incomes were unlikely to include any extra income linked to these interventions – all crops for which project interventions were received at any point over the three years have been included as 'project-related' in all years for these calculations, in order to more accurately display the nature of the subsequent changes in the endline year.



With project inputs focusing on staple food crops (rice, maize and sweet potatoes), cash income from these sources made up only a small proportion of overall cash income (Fig. 5). For all beneficiary households combined, this decreased from 8.44% in the year to 6.66% in the endline; the number of households selling project-related crops fell from 10 to 7 out of the 13 beneficiary households, or 77% to 54%. However, the median 'raw' cash income each year for those beneficiary households that did sell project-related crops rose from 23,250 kwacha to 48,781 kwacha.

All beneficiary households had other sources of cash income in both years, but the median amount per household decreased from 148,000 kwacha in the baseline to 60,976 kwacha in the endline.



Figure 5: 'Project-related' and 'other' cash income¹⁸

¹⁸ Beneficiary households indicated by a label on the *x* axis showing their beneficiary type. Although some households were not beneficiaries at all in the baseline year or newly received interventions for a different crop in the endline year – and so their baseline incomes were unlikely to include any extra income linked to these interventions – all crops for which project interventions were received at any point over the three years have been included as 'project-related' in all years for these calculations, in order to more accurately display the nature of the subsequent changes in the endline year.



4 beneficiary households increased their cash incomes from project-related sources, by a median 21,372 kwacha. Two of these households were the two 'rice beneficiaries', with one each of the 'maize and rice beneficiaries' and the 'maize, rice and sweet potato beneficiaries'. There were decreases in cash incomes from project-related sources of a median 10,828 kwacha for 7 beneficiaries (including the households who no longer had any cash income from project-related sources).

Fig. 6 shows the impacts of changes in project-related income sources on beneficiary households' disposable incomes.



Figure 6: Effects of 'project-related' income changes on beneficiary households' DI/AE, baseline to endline¹⁹

Effect of baseline to endline project-related income changes

Endline DI/AE without baseline to endline project-related income changes

¹⁹ Beneficiary households indicated by a label on the *x* axis showing their beneficiary type. Although some households were not beneficiaries at all in the baseline year or newly received interventions for a different crop in the endline year – and so their baseline incomes were unlikely to include any extra income linked to these interventions – all crops for which project interventions were received at any point over the three years have been included as 'project-related' in all years for these calculations, in order to more accurately display the nature of the subsequent changes in the endline year. Also note that while other charts in this paper are displayed in order of baseline DI/AE, this chart is displayed in order of endline DI/AE, to better demonstrate the impacts of changes in project-related income sources.



The median effect of these changes overall was 0 kwacha: for 6 of the 13 beneficiary households (46%), changes in income from project-related sources had positive effects on disposable income (median 8,271 kwacha per adult equivalent), and for another 6 of these beneficiaries the changes had negative effects (median -17,086 kwacha per AE), while the 'sweet potato beneficiary' household had no project income in either year and so its DI/AE was unaffected.

4 of the 6 households for whom the baseline to endline changes in project-related incomes had a positive effect on endline DI/AE had increases in both their food and cash income from these sources. The fifth household where there was a positive effect had greatly increased food income from its project crops but slightly decreased cash income, and the sixth household had a slight decrease in 'raw' food income that was proportionately less than the reduction in its food energy requirements due to changes in household demography.



Figure 7: Absolute impacts of 'project-related' income on beneficiary households' DI/AE, baseline and endline²⁰

²⁰ Beneficiary households indicated by a label on the *x* axis showing their beneficiary type. Although some households were not beneficiaries at all in the baseline year or newly received interventions for a different crop in the endline year – and so their baseline incomes were unlikely to include any extra income linked to these interventions – all crops for which project interventions were received at any point over the three years have been included as 'project-related' in all years for these calculations, in order to more accurately display the nature of the subsequent changes in the endline year.



Fig. 7 shows the absolute impacts on disposable income of these project-related income sources in each year. In the baseline year, 3 households would have fallen below the food poverty line ('0' on the y axis) without any income from these sources, and 1 household would have fallen below the standard of living threshold (not shown in Fig. 7). In the endline year, these income sources kept 4 households above the food poverty line and 3 households above the standard of living threshold.

At these margins, the crops that project interventions sought to support were therefore important. However, the high purple and green columns of some beneficiary households on this chart also indicate the importance of other income sources²¹.

Conclusions

This study highlights the complexities of monitoring project impacts and the contributions these make to increased resilience in situations of extreme climate stress, particularly where the interventions are directly linked to crop production.

In the lakeside village, project staff recorded comments that "the crop did not do well because it was distributed late and was also destroyed by pests and livestock", "repayment [of seeds was] not satisfactory due to poor production", and "the [sweet potato] crop did not do well because it was procured and distributed late and again the area was also affected by dry spells". Similar comments were made with respect to the village adjacent to the nature reserve: "during the early stages of cropping, crops looked well since farmers worked hard in their rice field. But as it was going towards maturity stage, their fields were over flooded with rain water and resulted into poor yield". "The [sweet potato] vines did not do well because of the dry spells that affected the whole area". "Rice was sown in January but transplanting has not started till now because farmers have faced shortage of water in rice fields".

Information of this kind recorded by project staff, quantitative IHM analysis as set out in this report, and the perceptions of community members documented in the QUIP studies provide important evidence for policy makers. As greater emphasis is placed on mitigating the impacts of climate change on rural communities, the assumptions that inform donor and government investments will come under increasing scrutiny and appropriate tools are needed to test hypotheses and inform a wider public debate. The studies presented in this project will, we hope, contribute to this work.

²¹ The other income sources are understated in Fig. 7, because of how this presentation of disposable income (the money remaining to a household after it has met its food energy requirements) hides/obscures the full income used to meet those food energy requirements when displayed in this way – i.e. the income used to get to a disposable income of 0. Disposable incomes were presented in this way in Fig. 7 to make the 'project-related' income sources' impacts clearer; the fuller importance of the other income sources can be derived from the households' total food and cash incomes in Figs. 4 and 5.