WORKING PAPER: 9

Assessment of rural livelihoods in a lakeside community, NB, Homa Bay, Kenya

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April 2018

Acknowledgements

DOI *10.5281/zenodo.5113425*

Background

This assessment was conducted as part of the HyCRISTAL rural livelihoods study and complements the 'Assessment of rural livelihoods in two lakeside communities, Mityana and Mukono districts, Uganda' (Petty et al, 2016). As with the earlier study the aims were to demonstrate the range of analytical output that can be derived from household economy studies using the [Individual Household Method](#) (IHM), and to understand the different capacities of households to adapt and diversify their livelihood activities in response to rapidly changing economic and climatic conditions. This baseline data will be used in pilot climate – livelihoods impact modelling exercises using IDAPS, (https://zenodo.org/record/3701722#.YGsaMS1Q3fY), the Integrated Database for African Policymakers. IDAPS was co-developed by Evidence for Development and the Walker Institute as part of the HyCRISTAL rural livelihoods pilot study.

Executive summary

The report describes household economy in NB village, Homa Bay county. A quantitative, household economy approach, the Individual Household Method (IHM) was used to provide: (i) a measure of household food security and ability to meet a locally defined basic standard of living; (ii) disaggregated information on income and income sources, including analysis of the proportion of household income derived from crops, livestock, employment, fishing/wild foods and gifts from family and others; (iii) disaggregated information on income generating activities mainly carried by women, and activities mainly carried out by men; and (iv) data on household assets, together with a more detailed breakdown of basic household characteristics, including female headed households[1].

Whilst all households surveyed were able to meet basic food and non-food needs, there was substantial income inequality between the highest and lowest income groups. Income from fishing was concentrated among boat owners who were at the top end of the income distribution. Poorer households derived their income from a range of activities including services (petty trade, small shops etc) and agricultural labour. Most households owned land and a small number of goats and chickens, but land holdings were on average less than 1 acre. Households were able to produce, on average, around 46% of their food energy needs from their own crop production, supplemented in some cases by their fishing and livestock production. Around 20% of households produced vegetables, including tomatoes, for sale but only one household gained significant income from agriculture.

The quantitative livelihoods analysis was complemented by focus group and key informant discussions with community members, as summarised in Annex 1. These groups described a steady reduction over recent decades in income from fishing, and poor yields from agriculture. Lower crop yields were attributed partly to changing climatic conditions, including a late start to the main rains (March/April rather than February) and drought conditions in the short rains (Oct/Nov). Division of land due to population growth had also affected yields, along with the high cost of agricultural

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[1] See Annex 1 and www.efd.org for additional technical details of IHM methodology and further IHM studies and reports

inputs. Over-fishing and resulting smaller catches were attributed to population growth, together with poor lake governance.

Environmental health conditions were poor, with few latrines and limited to access to clean water. Older residents described the lake as being '*much more polluted*' than in the past, due to human waste and run off from agricultural chemicals. However, despite high levels of pollution, households across the income distribution used lake water for some domestic purposes, with the poorest households using it for drinking as well as washing.

The community has been badly affected by HIV/AIDS. 20% of households are female or elderly headed, and many households are caring for orphans from the extended family. Education levels were described as low, with many young people dropping out of school but only able to find low skilled, labouring work.

As in the HyCRISTAL rural economy study in Uganda (Petty et al., 2016), women attributed the change in gender relationships mainly to the decline in cash income from traditional sources, which had led them to take up income generating activities outside the home. Better access to education had also played a role. Falling yields from local staple crops, the decline in fishing income and rising living costs all meant households needed more cash to maintain living standards. The main activities in which women were involved included selling fish (fishmongers), selling cooked food, selling beer and rearing and selling chickens. Legal changes enabling women to inherit land had made some impact on gender relations, although their property rights were not always respected in practice.

Across the community, obstacles that were seen as preventing households from improving their economic situation were described as poor governance at every level (from maintaining fish stocks to environmental health), lack of access to credit and low levels of education. Government soft loans involved high levels of risk, including loss of land in case of default. Consequently, informal systems (SACCOs, merry go rounds etc) involving smaller sums provided the main source of credit.

Introduction

Rural communities across the Lake Victoria Basin face many challenges in sustaining and adapting their livelihoods in response to rapidly changing social, economic and environmental conditions. This study was carried out as part of the rural livelihoods pilot study under the HyCRISTAL[2] project which aims to reduce the current high levels of uncertainty in projections of climate change in the Lake Victoria basin. A key objective of the HyCRISTAL rural livelihoods pilot study (http://www.walker.ac.uk/research/projects/hycristal-integrating-hydro-climate-science-into-policy-decisions-for-climate-resilient-infrastructure-and-livelihoods/) was to demonstrate the need for reliable, disaggregated socio-economic information to support decision making in the climate-resilience policy domain, and to complement advances in climatology with improved quantification of the immediate challenges of low adaptive capacity.

This report complements studies conducted in Uganda in 2016-17 at lakeshore sites in the Katonga catchment of the Lake Victoria basin. (Petty et al., 2016, 2017). Homa Bay county in Kenya was

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[2] Part of the DfID/NERC funded Future Climate for Africa programme

selected for the present study, as its rainfall regime differs from that of Mukono [3], but in common with Mukono, communities along the lakeshore rely heavily on fishing. The study was conducted over a 10-day period, from 9-19 April 2018.

Methodology

The Individual Household Method (IHM) was used to conduct the quantitative household economy survey (Seaman et al.,2014, supplementary data). The objective of the quantitative IHM study was to gain insight into the current distribution of income across the population of a lakeshore village, selected as 'typical' of others in Homa Bay county,[4] to identify the sensitivity of different sections of the population to changes likely to reduce income from specific sources (including fishing, different crop types etc), and to understand the capacity of households at different levels of income to invest in change and adapt the way they earn a living. To explore other significant factors including social, cultural and legal and governance issues relevant to livelihood adaptation and income diversification, the quantitative analysis of household income was complemented by focus group and key informant discussions, including conversations with men and women of different generations and a range of assets, skills and experience. These conversations provide a historical perspective, contextualising the analysis of a livelihood system in the process of change as well as a commentary on contemporary livelihoods. They offer policy relevant evidence of opportunities for and barriers to, economic diversification, new investment, and livelihood adaptation. Collectively, information from the quantitative IHM analysis and wider discussions with the community were presented at a knowledge exchange workshops conducted by local members of the research team at a workshop in Homa Bay. The purpose of the workshop was to extend the evidence base available to local decision makers to promote livelihood resilience at national, district and community level. When linked to HyCRISTAL's improved projections of regional climate change, this information will also contribute to longer term modelling of the likely impact of climate change on local populations and livelihood systems.

The study area: NB Village, Homa Bay, Kenya

The study was conducted in NB village, Homa Bay county which is located 16 km from Homa Bay town. It is one of three village clusters that make up the NB community. The village is about 2 km from the main road and 20 minutes' drive (2 hours' walk) from the nearest main market centres.

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[3] Mukono rainfall is more uniform during the course of the year than Homa Bay, which experiences much larger contrasts during the course of the year. Mukono: https://us.worldweatheronline.com/v2/weather-averages.aspx?locid=2534011&root_id=2529715&wc=local_weather&map=~/mukono-weather-averages/mpigi/ug.aspx; Homa Bay: https://us.worldweatheronline.com/v2/weather-averages.aspx?locid=1312804&root_id=1312150&wc=local_weather&map=~/homa-bay-weather-averages/nyanza/ke.aspx

[4] Selected during a scoping study by the local research coordinator, John Owuor, and EfD associate, Hosea Machuki. Logistical considerations, including distance from Homa Bay town and accessibility in the rainy season were included in the selection criteria, in addition to the community's main economic activities, size of population and access to markets.

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This is a settled community, with little inward migration and made up mainly of people from the Kamasawa clan.

NB has a bi-modal rainfall. The main rains are from March-May and the short rains from October to November (Climate data.org). However, according to local key informants, the short rains are now highly unpredictable affecting cropping patterns and farm income .Soils are of medium to poor fertility.

The nearest primary school is 2 km from NB village, and the nearest secondary school is 4 km from the village. The nearest dispensary is also 2 km from NB.

This community is off-grid. Most households access solar power for 2-6 hours a day, at a cost of around 300 Ksh/month. Firewood is used for cooking, resulting in widespread deforestation.

Drinking water is purchased from tankers at a cost of 5 Ksh /20ltr, or alternatively sourced from harvested rainwater during the rainy season, or directly from the lake. Sanitation is a major problem, with families using latrines shared with up to 50 households. There is no garbage disposal service. Local government has provided a water pump, several latrines and a tank for rainwater harvesting.

Employment opportunities for young people are limited, and school drop-out rates are high. Informal financial associations for mutual support and self-help include 'merry go rounds', Savings and Credit Cooperative Organizations (SACCOs) and table banking.

NB is a fishing community but in addition to fishers, there are also some farming households, some that combine fishing and farming, and others that provide services including boat making, shops, bars, restaurants etc. Most households have small landholdings and keep some chickens, sheep or goats to provide cash when needed. The main staple crops grown are maize, millet and sorghum.

The study site was purposively selected as typical of lakeshore communities in Homa Bay county.

The research team

The research was led by the same core team of regional IHM experts who had worked together on the HyCRISTAL rural livelihoods pilot study in Uganda[5]. The local research coordinator from Maseno University liaised with local authorities, facilitated fieldwork and supervised 6 postgraduate students from Maseno University who joined the team. He also led the ethnographic, community focus group interviews. The students received training in IHM methodology and translated for team members who did not speak the local language.

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[5] Stella Ngoleka, EfD associate, Malawi and team leader; Hosea Machuki, EfD associate, Kenya and team leader; Eunice Achiro, Luka Alip, Gulu University, Uganda; Ivonne Awuor, Mugah Raphael Wanga Ali Joan Akoth Ojijo Brenda Adhiambo Oluoch , Maseno University MA students

Overview of IHM protocol[6]

At the start of field work, a detailed map of NB village was drawn, and a series of focus group discussions was held to establish a basic understanding of the village economy, prior to the individual household interviews. The focus groups were made up of men and women of different ages, involved in different types of activity; data was collected on the way in which households in NB generate food and cash income, and the returns from these activities. Information was also collected on the 'staple diet' – i.e. the food that a poorer household would buy when their own production had run out, and on the costs of essential items that households need to buy to reach the minimal 'standard of living' norms for their community. This provided the team with a rapid overview of the context in which the assessment was being conducted.

Every house was marked and numbered on the village map, and the name of the household head was noted. A total of 53 households were enumerated. 10 of these households had their main residence and businesses in Homa Bay town but retained a property in the village. The remaining 43 households were available for interview, and of these, 41 were included in the final analysis. 2 households were excluded as the data collected was incomplete, due to the absence of household members with relevant information.

IHM interviews are 'structured conversations' which allow an active dialogue between the interviewer and interviewee to take place. Information is collected on household demography including the age and sex of all household members and their level of education (primary, secondary or tertiary); information is also recorded on land, livestock and other assets including boats, fishing nets and items used to generate income. Interviewers discuss all sources and levels of food and cash income generated by the household during the 12-month study period[7] (for this study, June 2016-May 2017). Additional information relevant to the study is also collected: for example, on fertiliser use, use of extension services. For this study, questions on access to and use of water and sanitation were included in the household interview.

At the end of the day, data is checked and uploaded into the IHM software and households requiring call-backs, where information appears to be incomplete, are identified.

Findings

IHM survey findings included in this analysis include data on:

- •   Population
- •   Income distribution, including a breakdown of disposable income per adult equivalent by income quintiles
- •   Analysis of the main sources of food income across the study populations, from poorer to better-off households, i.e. food produced by the household and retained for its own consumption
- •   Analysis of the main sources of cash income across the study populations

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[6] See Annex 1 and www.efd.org for additional details of IHM methodology
[7] This was the most recent complete agricultural year

- Analysis of main productive assets

Population

The 41 households included in the survey had an average of six household members. Of these 41 households, 8 (just under 20%) were female headed. This includes grandmothers caring for younger children, widows, and single women. The high proportion of female headed households is partly explained by the high prevalence of HIV/AIDS among lakeshore communities.

Income distribution

Figure 1 shows the distribution of income in NB. Each bar represents a household, with the poorest household on the extreme left and the richest on the extreme right. Households are displayed in order of 'Disposable Income'. In IHM terminology, this represents the amount of cash remaining after the household has met its food energy requirements[8], either through production, market purchase or - in most cases - a combination of both. 'Disposable Income' is referred to as 'DI'. The chart shows income standardised according to household size - 'per adult equivalent' (/AE) to allow households of different size and demography to be compared[9]. Households are grouped in the chart by income quartile.

Figure 1. Income distribution of annual disposable income/AE

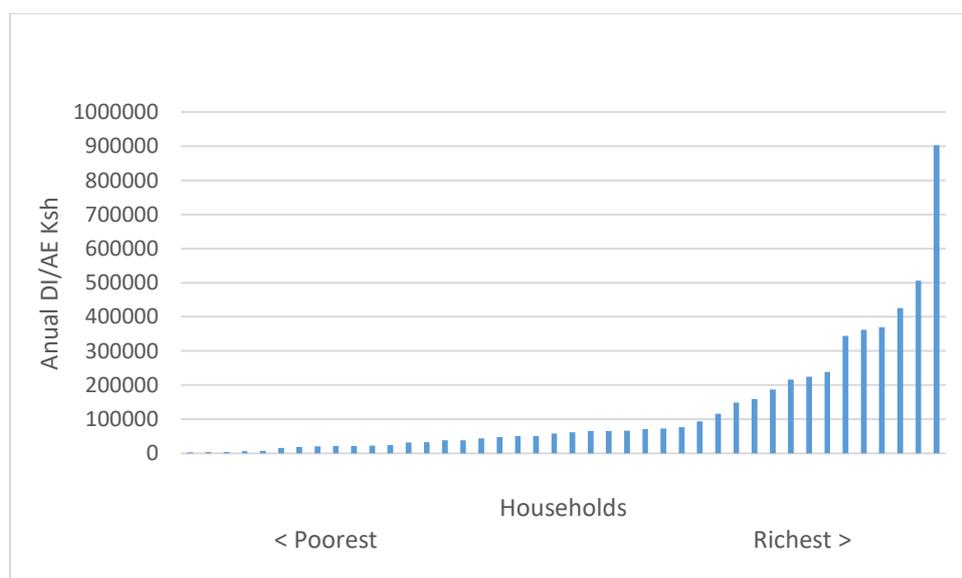*Table 1. Disposable income per AE by income quartile in Kenyan Shillings (KSh) and US Dollars (USD)*

	Average annual disposable income/AE			
	Q1	Q2	Q3	Q4
Ksh	13,263	43,552	93,361	377,705
USD	130	420	919	3,718.

[8] Requirements are based on WHO reference standards
[9] See Annex 1 for definition of terms used in IHM analysis

Table 1 shows the average disposable income (per adult equivalent) of households in each income quartile, with USD equivalents. Incomes in Q1 and Q2 leave little cash available to meet routine living costs. These households are vulnerable to any loss of income and would have difficulty meeting health or other unexpected costs.

Standard of living

Having met basic food energy needs, the income remaining was sufficient for all households to purchase a minimum basket of basic goods considered essential for social inclusion (soap, fuel, replacement set of clothes, salt, sugar, oil, water charges, primary school costs etc). Items and costs of basic standard of living requirements identified by a focus group of poorer women in NB are shown in Annex 3. However, the poorest households had very little additional cash for savings or for investment. Note that in this community, nearly all households owned their own homes so rent does not appear in this list of essential living costs.

Income by source

Figure 2. Main sources of food income (Kcals), NB Homa Bay
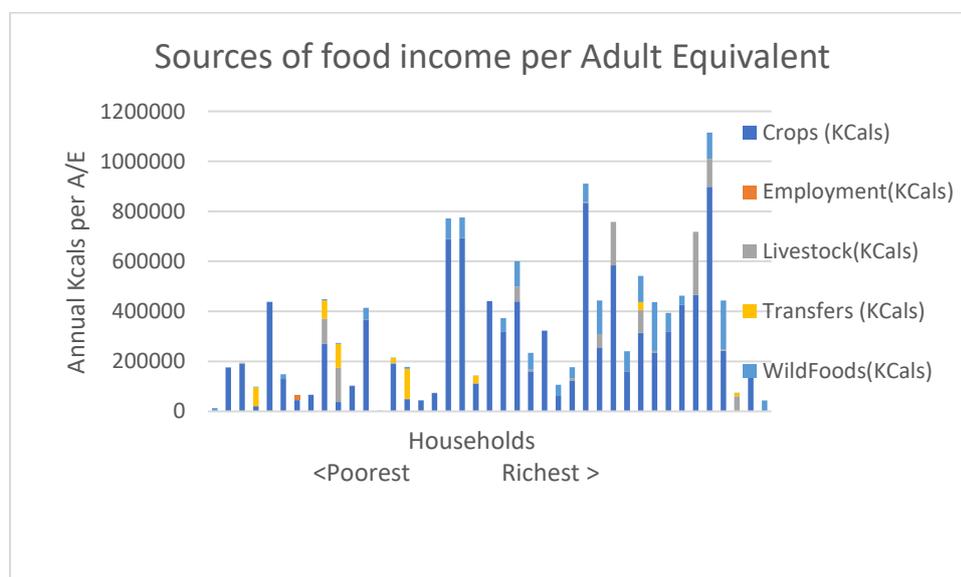
Whilst there is considerable variation in the amount of food produced for household consumption, households produce, on average, under half of their basic food energy needs, and are dependent on market purchase for the remaining staple food requirements. Only 2 households approach self-sufficiency in food energy, producing just under 100% of their household requirements[10]. Most food

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[10] Annual food energy requirements per adult equivalent are 949,000 kcals

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income is derived from crops produced by the household. Fish (wild foods) retained for household consumption is shown in pale blue and livestock and livestock products is shown in green.

To gain insight into the potential vulnerability of households to the failure of specific crops (for example, to pests such as army worm, or changes in temperature and precipitation), Figure 3 shows the contribution of the individual staple crops grown in NB to overall food income.

Figure 3. Main food crops, NB 2016-17
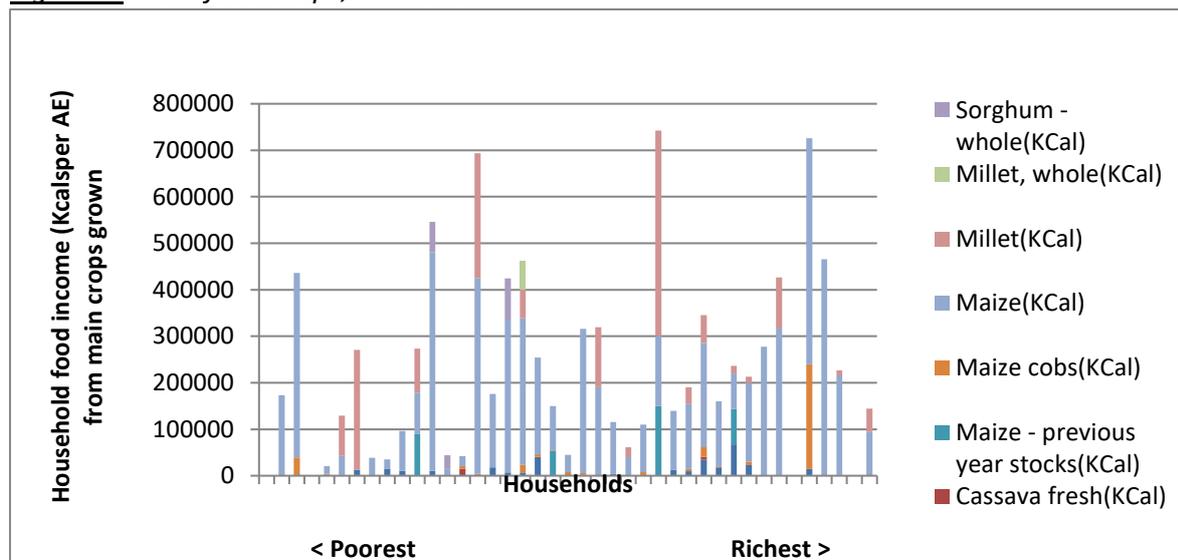
Figure 4 shows the main sources of cash income in NB, classified by income source. The relative importance of income from employment among poorer households (red bars) and income from fishing (sale of wild foods, indicated by the blue bars) among better off households is striking.

Figure 4. Main sources of cash income, NB 2016-17
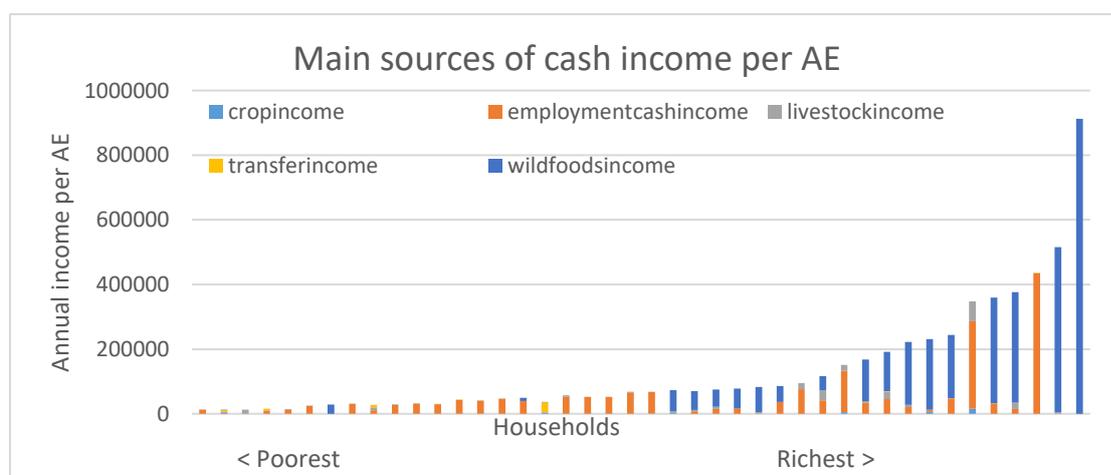
Only households in the top half of the distribution gain significant in come from fish sales-these are boat owners. Poorer households gain most of their income from low paid employment and self-

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employment, including work related to the fishing (fishing day labour), petty trade, work in bars and restaurants and some agricultural labour (mostly weeding and harvesting). Livestock only account for a small proportion of cash income and income from crop sales is extremely low. Only 7 households recorded income from crop sales-the amounts are too small to appear on the chart. Further disaggregation of income from fish according to fish type shows very clearly the concentration of income from fish catches at the top end of the income distribution, and a degree of specialisation among boat owners, with most fishing for 2 types of fish, Tilapia and Nile Perch. Of the 17 households recording significant catches, Tilapia is caught by the greatest number (14 out of 17) followed by Nile Perch and Ukoko. Tracking changes in income from different types of fish is also useful in managing fish stocks and potentially in targeting individual fishers with information that may influence their choice of fishing gear. The earnings of these boat owning households are significantly higher than most households providing services around the lake.

Figure 5 provides a breakdown income from a range of lakeshore (shops, bars, restaurants, fishmongers etc. Most of these lakeshore activities, including selling fish (fishmongers) are conducted by women and generate cash that is spent mainly on household welfare (food, school fees, clothes).

Figure 5. *Petty trade and other sources of cash income from lakeshore activities, NB*
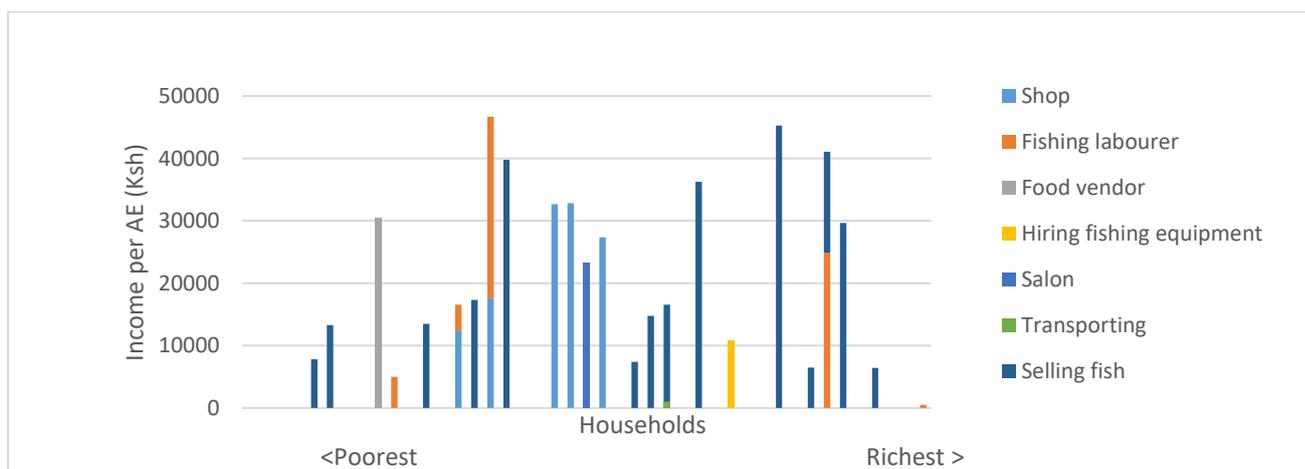
Whilst some income is re-invested, profits are relatively small. For example, the average annual income from selling fish was only 19,260 KSh per A/E in the study year, which limits access to credit to develop and expand this type of business. By contrast, boat owners in the top half of the income distribution could earn between 200,000 KSh and 500,000 KSh per A/E from fishing. The highest earnings approached 1m KSh.

Income from the sale of crops is low, with tomatoes providing the main source of revenue in the study year.

Assets

Landholdings

31 of the 41 households surveyed own upland (Fig. 6). Excluding an outlier household, that owns 10 acres[11] the average size of plots among these landowning households is 1.05 acres. The average size of wetlands, which are also owned by 17 of these landowning households, is 1.3 acres. Land is used for both crop growing and livestock. Most of the crops grown, which include maize, millet and sorghum, are for home consumption.

Figure 6. Landholding, NB
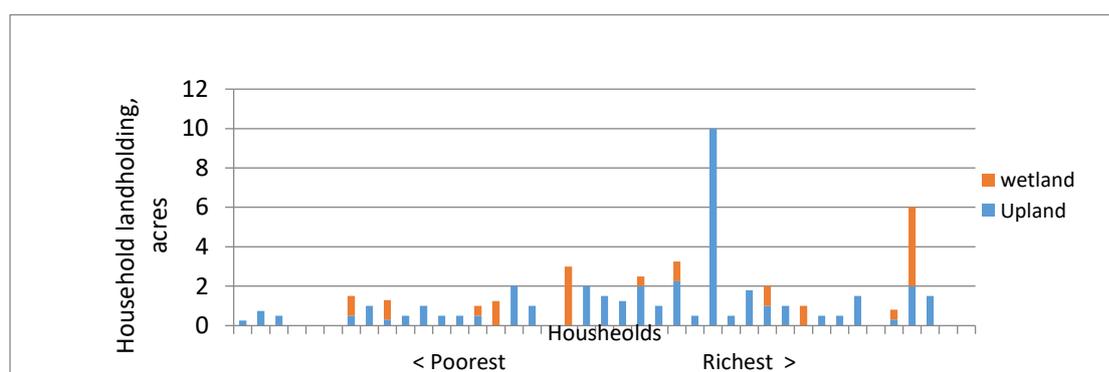
The distribution of landholdings is relatively equal across the income distribution, with 3 households in the poorest and 3 in richest quartile without land. However, better off households have larger plots than poorer households. In quartile 1, the average size of plots among landowning households is 0.5 acres, whilst the average size in quartile 4 is 1.5 acres. This means that the better off have greater scope to increase both crop and livestock income than poorer households if conditions indicate that the returns would merit the investment.

Figure 7 shows the distribution of livestock holdings across NB village, and Figure 8 shows the cash income derived (per AE) derived from these livestock.

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[11] This is a multi-generational household and may include land inherited from a number of sources. Further enquiry would be needed to confirm this.

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Figure 7. *Livestock holdings, NB*
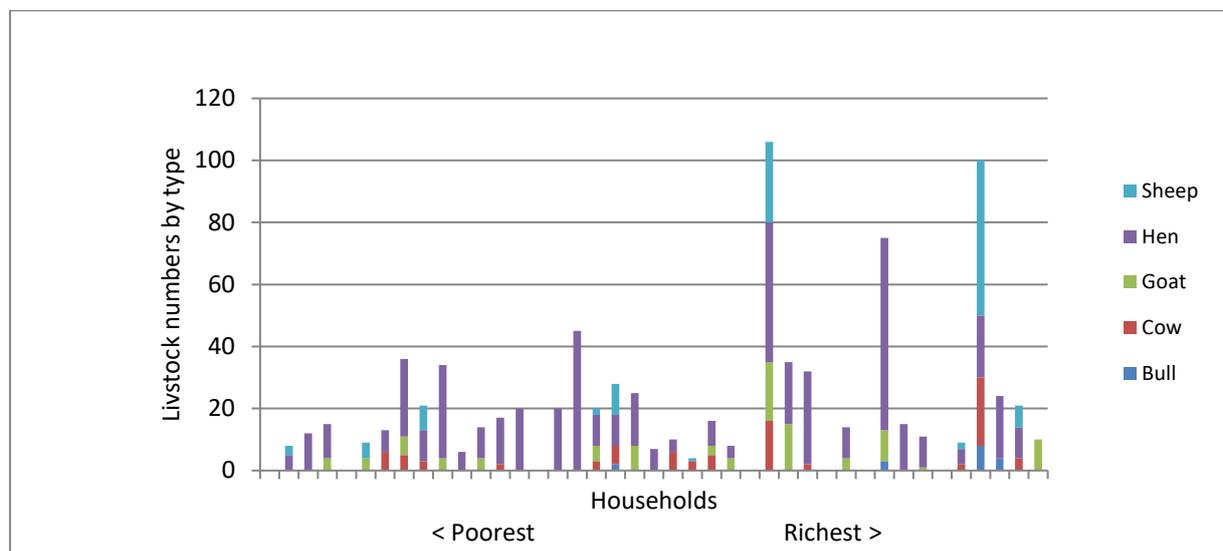
Figure 8. *Income from livestock*
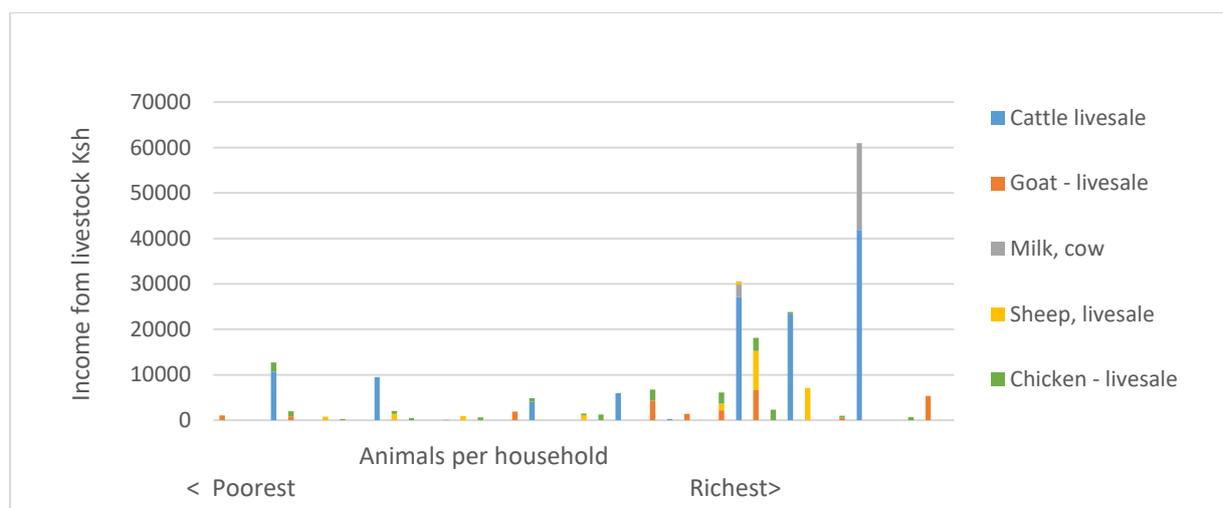
The most valuable livestock assets held in NB are cows, which generate income both from milk and also from live sales. 14 households (around a third of the total) own cows, but the numbers owned per household are small, due to limited landholdings. Goats or sheep are owned by 18 households and are valued as a source of ready cash when this is needed. Over half the households surveyed owned chickens and gained income from the sale of chickens. Ownership was spread across all income quartiles. Rearing chickens was identified by women as one of the main enterprises in which they could invest. However, the average income from these enterprises was low: 2,880 KSh among chicken rearing households in the poorest quartile and 7,140 KSh among chicken rearing households

in the richest quartile[12] . As shown in Figure 8 income from sheep, goats and cows was greater among better off households.

Discussion

This analysis reveals the potential sensitivity of individual households, groups of households and the community as a whole to specific shocks (for example an outbreak of disease affecting a crop, fish species or livestock type). Thus, in addition to providing information on the main sources of income under the broad categories of employment, wild foods, crops, transfers and livestock, IHM baseline data can be used to model the way in which different households would be affected by the loss of any of these specific income streams to assess the costs of intervention and direct assistance appropriately. This might include cash transfers; suspension of school fees; fee waivers for maternal and child health services etc.

IHM data can also be used in a developmental context to improve the targeting and uptake of initiatives to improve climate resilience: for example, to understand the proportion of households able to invest in new seed varieties or farming techniques. Information on disposable income and on current profits from farm enterprise, fishing and petty trade thus provides the data needed to better understand the financial barriers to adaptation facing many households, and factors that increase the sensitivity of some households to climate and other shocks.

To gain a more nuanced perspective, perceptions of change and the drivers of change were explored through a series of focus group discussions. The main findings are outlined in Annexe I below. This draws on interviews conducted by John Owuor (Maseno University), and used the same interview protocol described in *Change, response and adaptation in a Lakeshore Village, Mukono District, Uganda* (Petty et al, 2017) with additional information from interviews supervised by Stella Ngoleka, an EfD Associate from Malawi.

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 DOI *10.5281/zenodo.5113361*

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[12] The value of these sales ranged from 28,800 Ksh in the household with the largest number of chickens to 500 Ksh in one of the poorest households with very few chickens

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ANNEX 1

Focus groups[13]

A similar protocol was used in these focus groups as in the previous year's study 'Change, response and adaptation in a Lakeshore Village, Mukono District '(Petty, C., Achiro, E., Acidri, J., 2017). In both studies, the aim was to complement the quantitative Individual Household Method (IHM) study of differences in household resilience and capacity to adapt to climate and other shocks, with an understanding of qualitative social, historical and institutional constraints. We also wanted to explore different gender dimensions of these issues. Community leaders were asked to convene the meetings, ensuring that a cross section of residents was included in the group, including better off and poorer members of the community.

Conversations with older people

Discussion with six older, long-term male residents

The group was made up of two Beach Management (MBU) committee members, two fishermen, and two businessmen. The conversation started with an open question: How did people live in this community 20-30 years ago? Did people in this community live in much the same way now? If there had been changes, in what ways had things changed? In their view, what were the most important reasons for this change?

The first point highlighted by older male respondents was a loss in the sense of community:

"…before there was a sense of belonging, togetherness and love among community members".

They spoke of the depletion in fish stocks and over-fishing which they attributed to population pressure, use of illegal gear an 'improved technology'

"…fishing was often based on shallow waters. Currently fishermen have increased pressure on fisheries".

They also believed that lower rainfall had resulted in reduced lake levels and lower catches

"… thirty years ago there was plenty of fish and fish for food was given freely. This has changed because fish is scarce and expensive and currently there is no free fish given as gift for food".

The lake had become more polluted, which was mainly attributed to population pressure and poor hygiene and sanitation. The older men spoke of "Dramatic changes in weather patterns and… changes in wind 'kalausi'."

As a result of the reduced catches, people were turning to other activities, including sand mining and charcoal burning "to complement income from fishing in the village".

Unpredictable weather patterns had also affected farmers. Due to prolonged dry periods and sometimes excessive rain, yields had fallen, and in contrast to earlier times, most food was bought in Homa Bay town. Plot size had also reduced, and land formerly used for arable was now used for housing.

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[13] Focus groups were led by John Owour, Maseno University.

They commented on changes in gender relationships.

"In early days men used to make decision on household expenditure, this has change because women contribute to sizable expenditure in the household."

They also noted that:

"With introduction of 2010 constitution women are nowadays allowed to own assets. However, the community culture is making hard for them to inherit assets such as land from their parents"

They observed changes in community leadership which they described as *"money minded, corrupt, selfish and are not mindful of the wellbeing of the community."* According to these respondents, the biggest risk they faced was the *"change from communal life to individualism. In thirty years ago community used to take care of the poor and ageing parents. Currently things have changed. Children work in Urban and concentrate more on nuclear family. The poor are neglected by community to fend on their own."*

In a final question, they were asked what kind of investment would have the greatest impact on the challenges they faced. Their priorities were:

- Building more toilets around the beach.
- Piping water to beach for drinking
- Design better boats to withstand strong wind
- Use of proper fishing gears
- Timely weather forecast for fishermen and farmers
- Introduction of life safety jackets for fishermen
- Purchase of rescue boats to help fishermen during accidents
- Tarmacking road to the beach

Discussion with 6 older, long-term female residents
The same set of questions was used to prompt discussions with a group of older female residents: How did people live in this community 20-30 years ago? Did people in this community live in much the same way now? If there had been changes, in what ways had things changed? In their view, what were the most important reasons for this change?

This included the beach management unit treasurer, two committee members, a woman who traded in second clothes, a food kiosk owner and a fishmonger.

Describing the changes that had taken place in their adult lives, they focused on the increased cost of living and the reduction in fish catches, which has had major implications for women:

"prices have increased, thus making life very expensive as compared to 20-30 years ago. Fishermen then, would find a lot of fish in the lake this made food availability easy, in the present day, fishermen manage to get few."

Their next observation related to the high rates of HIV/AIDS and the many deaths that had taken place in the community as a result. They also commented on higher exposure to malaria, which

some attributed to modern housing with windows, and to the decline in the use of traditional herbs which helped women in childbirth. On changes in diet, they said that:

*"The kind of food that people ate 20-30 years ago made people strong, in that it involved a lot of traditional vegetables, sweet potatoes, porridge made from millet, ugali made from cassava. This has changed, people have started feeding on modern type of food which has made them wea*k".

Team members noted the significant amount of cooked food available in the village, and the very widespread purchase and consumption of 'chapati' type bread. This merits further enquiry but is likely to reflect changing patterns of women's work and higher prices/lower yields from local staple crops.

Women's views on gender relationships differed in some respects from those of men. Men asserted that they were the main decision makers.

"Men make all decisions being the fact that they are breadwinners in the household. Men make main decisions when it comes to division of land, building houses, planting of trees in the home, socio-cultural decisions i.e. marrying, distribution of wealth to the children."

However, women noted that:

"women are challenging the dominance of men in the society. For example, women are becoming breadwinners of their households."

Nevertheless, women face new challenges.

"…there has been increased gender-based violence in the community. The power imbalance between men and women results to increased violence."

They noted that:

"Women now have new opportunities like going to school as compared to the past. More businesses have come up in the present like hotel, saloon of which women can earn money from. More women have also been educated and have higher opportunities just like men to become teachers, doctors, lawyers of which was not the case in the past".

Raising capital to start a business was not easy:

"Women in the present need to have more money in order to start up any business, of which may take time and patience"

One woman explained:

"The biggest risk I ever took was to sell my all my chicken in order to start up a business. It paid off, in that, I was able to take care of my baby, which I had just given birth to."

Another spoke of selling her chickens to start a second hand clothes business.

"I sold my chicken to start my second clothes business. Of which I have done for many years and has been doing well. I also had to sell my chicken to start selling mandazi [doughnuts] along the beach".

Difficulties in raising finance for business were also raised in discussions with younger women.

The older women spoke of the increased levels of pollution in the lake:

"*The lake water was very clear, and you could see through the water, of which is not the case as per now, the water is dirty. The lake also has water hyacinth which has made fishing very difficult.*"

This was due to increased population along the beach, and factories in the area "*that pollute the environment* ". Government could improve the situation by building free latrines along the lake and better regulating factories, along with "*awareness creation …for better health and the environment*"

Overall changes in culture described by older respondents included: change in diets, cultural norms of extended family, respect for traditional authority, and movement from communal life to individual life. Culturally unacceptable practices that had emerged or become more prominent over recent decades included prostitution, illicit brews, drug abuse and robbery.

Conversations with younger people

These conversations focused on adaptation and change, and started with an open question concerning opportunities for investment and enterprise.

Discussion with 4 young fishermen between 20-30 years and two young farmers

The group discussed the types of activities people like them could investment in. This included fishing, farming/cultivation of land, and transportation.

Most young men were involved in fishing, as they felt they lacked the skills to "*venture into other businesses*". The cost of starting up as an independent fisher was high, (around KSh 110,000), which explained the prevalence of illegal fishing. However, without an additional source of income, fishers who borrowed money for their fishing activities were likely to default on loans.

Sources of finance included merry go round (table banking), government loans such as the youth enterprise fund, the Uwezo fund, and informal loans from friends, as well as selling livestock etc. The problem with government soft loans was the loss of collateral (usually land) if the borrower defaulted:

"*This usually causes embarrassments to individuals and lack of respect in the community. Due to default in loan payment, their names are blacklisted in the bank, thereafter they are not able to acquire any other loan from any bank account*".

Government group loans were also problematic as they were often used by individuals to pay school fees, for funerals, or to buy food, resulting the group defaulting. The most reliable sources of loans were family and social networks who could also provide "*practical and moral support*".

Most people in the village acquired land through inheritance from the parents or from "*purchasing from willing sellers who often are the poor.*" The main problem the young farmers faced was a lack of land for livestock which "*require a large space for grazing which most of us don't have.*" They also indicated that farming was hard, and it was difficult to find farm labour "*this takes a lot of time while on the other hand fishing is easier according to them.*"

The main factors holding back livestock investment and investment in farming were described as:

- Land has been sold to outsiders therefore there is no space for grazing
- Diseases attack livestock which is very expensive to treat.
- During dry seasons, the livestock require feed which is expensive.
- During last year, strange army worms have been attacking maize crops which has reduced yield. These have been given the name Osama bin Laden (terrorist)

Discussion with 5 young women, 20-30 years

The same question relating to opportunities for investment an enterprise were put to a group of young women.

According to the younger women the type of activities people like them could invest in included salons, selling food stuffs, kitchen gardening, selling fish [fishmongers], selling second clothes and selling groceries. The capital start-up needed for activities was:

"Fishmonger KSh. 10,000, Shop, KSh. 50,000, Chicken rearing KSh, 50,000, and Kitchen gardening KSh. 50,000".

50,000 KSh is close to the average annual disposable income per A/E of households in Quartile 2, at the lower end of the income distribution. This illustrates the difficulties poorer women would face in financing their enterprises from current income.

The reasons these women gave for enterprise failure indicate and the difficulties of making a living within a poor community and the fragility of their businesses. Problems included:

"*Over dependence on profit to fend for family. Other family expenses such as funeral, hospital can also make business to fail.''*

"*…giving out goods on credits to close friends and family members when they are in need*" and "*Theft*".

They also mentioned:

"*No refrigeration for fish in that, this may lead to perishing of fish*",

"*Reducing fish catch, lower profit made from fish trade.*"

These women had access to the same sources of credit as the group of younger men: informal loans (merry go round, table banking), support from family and friends and borrowing. Government soft loans such as the women's fund and Uwezo (group lending scheme) were mentioned. However, like their male counterparts, they emphasised the risks attached to these loans:

"*most women fear applying for these funds due fear of defaulting and government grabbing of assets like land, livestock, house items on failure to pay in time, strict rules and regulations on borrowing, and high interest rates (12%)*."

They explained that confiscation of household items had led to family separation, particularly if the husband was unaware of the loan and that these loans had

"*led to occasional suicide due to frustrations and depression.*"

The women also mentioned if business were doing well "*they can easily be possessed by their husbands*".

They said the main support young women needed included business training and seed capital.

Opportunities outside NB: perspectives of young women and men

The younger men and women were also asked about migration and opportunities for work outside their village.

Some migration from the village had taken place. Reasons included "*looking for a better life, 'seeking greener pastures'*", reduced fish catches (attributed to changes in climatic conditions), increased living costs, continuing education, marriage, and the needs of a growing family.

"*Some have gone permanently, some one year, some two years some for few months during dry seasons*"

Most people from NB migrated to urban areas e.g Kisumu, Homa Bay, Nairobi, Mombasa. Jobs include tailoring, hotel management, teaching, police and other public service, and work with CBOs and NGOs. Some had started enterprises in the transport sector or run their own businesses (shops others are selling second clothes etc). Other continued to fish but had gone to areas where catches were reputed to be better (Ringiti, Remba, Migingo in the Mfangano islands).

Women said they would consider migrating for "*any kind of job which is lighter and security guaranteed*". They might also have to leave after "*calamities such as death, and the woman has to be the breadwinner*" or "*population pressure and the family's need to find land somewhere else*". Lack of social networks were a deterrent as "*you cannot go to an area you don't know anybody*".

They saw migration as positive as people who migrate

"*gain new ways of living, new ideas, in terms of cultural, social perspectives; they move to better dwelling places, they also learned new ways on roles played by men and women in other societies, they engaged in some social-political activities which they didn't used to. Through migration people learned how to live with each other hence spirit of brotherly peace love and unity is being promoted.*"

This group of women hinted that they would prefer migrating to other beaches or rural areas because urban areas are "*over-populated and cost of living is very high*". Successful migration depended on the availability of employment opportunities, existing social networks and money for transport. The worst circumstance for leaving are when you do not have a job and need to go in search for job opportunities.

The younger men were aware of new opportunities in motorbike transportation, barber shops in Homa Bay town, sand harvesting, quarry mining, construction and building, sales and marketing, and work as clerks in county government offices. However, many lacked the skills to exploit emerging

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opportunities in town, due high levels of illiteracy and corrupt practices that allowed under aged children to drop out of school and take up work in fishing.

Additional comments and quotations from conversations with community members, led by Maseno University students

The students led a series of discussions with individual key informants, focusing on agriculture, climate and fishing, and connections with Homa Bay town. One key informant also volunteered detailed information concerning the ethnographic background of the village

Agriculture and climate

"The weather/rainfall pattern has changed from the past in that currently there are prolonged drought seasons beginning the end month of July to March. The rivers in the area dry up faster compared to the past. Planting of crops only takes place once in a year between late March and July unlike before planting was done twice in a year the first season being between February to May and the second between July/August to November."

"The government does not promote agriculture in this area. There is no financial support such as loans and also no provision of hybrid seeds given to farmers, there are no cattle dips for livestock and even programs for livestock vaccination. The government also does not offer training to farmers on the current trends in agriculture. The agricultural field officers no longer walk in the community to offer trainings and take also and reports in the agricultural sector".

"People used to own cows back then and they would enjoy sour milk made using the calabash but it is currently not done and the number of animals have reduced greatly."

"People used to store food in granaries but currently people are not even storing food for their own consumption".

Fishing and aquaculture

Fishmonger case study:

"I buy the fish from the fishermen when they are back from the lake and I also sell to other customers. I use the little profit of 100/- I get daily to sustain my children. Selling fish makes you more money faster and is not difficult like farming which at times is unpredictable due to changing weather patterns. Also, the land in the village is not enough for all of us to engage in agriculture."

"What I like most about selling fish is I get good profits. The least [the worst thing] is sometimes the buyers/customers take the fish on credit and this affects the business."

"We the fish mongers buy from the fishermen and we wash them and sell to customers at the beach here and others from Homa Bay town. However, the fishing methods being used by the fishermen here is poor because they catch a lot of immature fish and this is depleting the lake."

"Nile perch is the most profitable fish and is available in the months of April, March, January and February. The average price is 200/- and in the middle it costs 300/=. It's more profitable because they are many in the lake compared to the other species."

Challenges include

" limited capital to expand on the business hence little profits".

"Competition from other sellers who at times buy all the fish pushing me out of the business. Lack of refrigeration facilities to store the fish."

"People die in the lake as a result of strong waves brought by strong winds and these capsize the boats. Fishermen are also hijacked by robbers/pirates while fishing and they are killed. Some fishermen also head to the lake when they are drunk and end up drowning."

"Illegal fishing nets. "There are no serious actions being taken by the local leaders to end this illicit act.

Action needed to reduce deaths and incidents

" Give life jackets to the fishermen. Improve on the security of the fishermen to protect against robbers. Motor engines should be provided to help with emergency situations at the lake/ rescue operations because they are faster."

"The government is not doing enough to promote aquaculture since there is no financial support and even resources given to those practising aquaculture they lack capacity building and financial support to promote aquaculture and also they lack sufficient knowledge and skills to practice better fish farming. "

Links with Homa Bay town

"People in this community do engage themselves in good number of activities and also benefit from Homa Bay town. Among the top are self-employment in activities such as tailoring, operating businesses such as big shops and kiosks, women in this community also engage in second-hand clothes businesses where Homa Bay town is the main market where they sell them. Homa bay town also servers the community with ready market for the sales of the fish from the lake, ready market for agricultural produce such as the vegetables and fruits like watermelons."

"Homa Bay town also benefits this community through the access of banking and insurance services since it is the only nearby town where banks are located, access to government services through government offices is also witnessed by this community members e.g. the access to title deeds through the ministry of land. The community also gets health services from the town since the County Referral Hospital is situated in Homa Bay. Some of the community members are also seeking informal employment opportunities such as watchmen and security guards both at day-time and night in Homa Bay town"

Ethnographic background
"The community members of this village [NB] originated from Central Nyanza. The Luos migrated from South Sudan and settled in some parts of Western Uganda before dispersing to Kenya where they settled in Central Nyanza at Ramogi Hills. They then dispersed again to Gem Yala currently in Siaya County where the final group again left to South Nyanza and one man that descended himself

from others at Gem Yala called Ochia settled in the present-day Kochia. Ochia gave birth to two sons namely Ura and Anam from his first wife Atieno Nyolwal. Anam and his brother Ura settled along the Lake Victoria shores to the west of Kochia ward and this community, NB village are descendants of Anam thus they form part of Kanam Sub Location in Kochia West Location in Kochia Ward."

"The people in this community are related as they come from the same one big clan of NB Kamasawa. The clan is however sub divided into other smaller units or families of Kolal and Kabuor comprising of Kotondi, Kamolo and Kaura respectively"

Cultural changes

"Communities used to cook using pots but have now resorted to using saucepans. The dressing code has also changed, and people are so indecent these days. Also, grass thatched houses used to be the way of housing but currently, semi-permanent and permanent houses have come up. People have also stopped being polygamous like it used to be in the earlier years. People have moved from the grass thatched houses to modern day buildings. Also, men used to marry with many cows but recently, the number of cows have reduced to between 2-4."

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Annex 2

Note on the Methodology of the Individual Household Method (IHM)

Data was collected from individual households, using the Individual Household Method (IHM), and from focus groups and key informants, using other standard participatory and ethnographic techniques.

The Individual Household Method (IHM) is a relatively new approach to measuring and monitoring income at household level, and like the well-established Household Economy Approach (HEA) which is also being used in the HyCRISTAL project, is grounded in Amartya Sen's theory of exchange entitlements[14] . The IHM allows users to disaggregate and quantify the contribution made by specific activities to a household's overall economic status and its capacity to access the goods and services required for social inclusion. It can also be used to model the potential impact of a shock or change on household income and living standards.

The IHM methodology classifies all income as either 'food income', measured in kcals, or 'cash income' measured in the local currency. Software designed by Evidence for Development (EfD) calculates the proportion of the household's total food energy requirement met by 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):

Equation 1: Disposable Income

$$
\begin{aligned}
\textit{Disposable Income} \\
= \sum \textit{Household Cash Income} \\
- [(\textit{Household Food Energy Requirement}, kcal \\
- \sum \textit{Household Food Income}, kcal) \times \textit{Price per kcal of staple diet}]
\end{aligned}
$$

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 further standardised by 'adult equivalent, giving disposable income per adult equivalent (DI/AE).

Finally, a 'standard of living threshold' (SoLT) is set. This represents the cost of a basket of essential items that are required to meet the local norms for social inclusion. Items are identified in consultation with groups of poorer women and men. Households that cannot afford the full set of items are described as being below the standard of living threshold.[15]

Data is generally collected for a twelve-month period covering the most recent 'agricultural year'. The agricultural year is established in consultation with the study community at the start of the assessment.

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[14] Sen, A., Poverty and Famines: An Essay on Entitlement and Deprivation (Oxford, 1981)

[15] see Annex 2 for definition of terms used in IHM analysis, and for more information a go to www.efd.org

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Annex

Definition of terms and concepts as used in the Individual Household Method (IHM) analysis

Household: A group of people sharing pooled resources and eating from a common pot.

Household food energy requirement: The sum of the food requirement of each individual in the household, according to their sex and age[16] and time present in the household during the study period.

The staple diet (and price per kcal of the staple diet): The staple diet consists of the foods that form the basis of the local diet purchased by poor households after their own food production (including gifts and transfers) has run out. This is identified in consultation with local key informants. A weighted price per kilocalorie is calculated[17]   based on the average (or mid-year) local market price of that diet during the study year. After taking account of food energy already derived from the household's consumption of own-produced food, the price per kcal of the staple diet is used to calculate the cost of purchasing the remaining calories needed to make up the household's total annual household food energy requirement. Analysis in each of the assessment locations used the mid-year market price for that location.

Cash income: All cash income from all sources (i.e. crop sales, sale of livestock and livestock products, employment/self-employment, cash transfers, and the sale of wild foods). Note that production and input costs are deducted from cash income. Where income is derived from petty trade, commerce, the sale of livestock or other sources, the amount recorded represents the profit made by the household after production or input costs are deducted. This means that a 'negative' income can be recorded if, for example, animals are sold at a loss.

Food income: All sources of income as food consumed (e.g. from crops, livestock products, payment in kind, food gifts and transfers and wild foods). Recorded in kilocalories (kcal).

Disposable income: The cash remaining to each household after it has met its total food energy needs, based on WHO reference standards[18]. This can be a negative value, if the household is unable to meet its full food energy needs with its available income.

The relationship between food income, cash income and disposable income: Disposable income (DI) is an outcome measure. It represents the money that remains to a household after the household's food and cash incomes have been allocated to meet its members' basic food energy (kcal) needs[19]. In the model, cash income is used to 'buy' the required kilocalories not covered by food aid or own production, in order to meet the household's basic food energy needs. The detailed information collected on the different types of food and cash income can be used to model impacts

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[16] 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

[17] For example, if the diet is 90% maize at 20 shillings per kg (with 3,630 kcal per kg) and 10% beans at 50 shillings per kg (with 5,600 kcal per kg), the price of the diet (per kcal) = ((20 / 3,630) x 0.9) + ((50 / 5,600) x 0.1).

[18] Food energy requirements derived from 1985 WHO reference standards (see above).

[19] Food energy requirements derived from 1985 WHO reference standards (ibid).

of changes in the prices, production or values of any income source(s) as well as changes to other defined variables

Adult equivalents: Disposable incomes and other figures can be standardised to take account of variation in household size by dividing them by the number of 'adult equivalents' in each household. The number of adult equivalents is calculated as the total household energy requirement divided by the energy requirement of a young adult (2,600 kcal per day)[20]. The standard IHM income distribution chart shows 'disposable income per adult equivalent' (DI/AE).

The food poverty line: Households that cannot access their basic food energy requirements[21] – either through own production, transfers, food purchase using cash income, or a combination of these – are described as being 'below the food poverty line'. Data for these households appears below the *x* axis (as negative *y* axis values) on the disposable income charts. The income deficit shown on the chart is equivalent to the cost of purchasing the quantity of food required to meet reference food energy standards, based on the cost of the cheapest staple(s) that form the local staple diet, established with key informants.

Quantiles: Data from individual households can be grouped into 'quantiles' (equal-sized data subsets) to allow for grouped analysis and to identify, where possible, trends and characteristics of households at similar income levels. This can be useful for targeting purposes, or to test assumptions concerning a particular section of the community or social category (for example people with disabilities, or female-headed households).In this study, the population is divided into quartiles; the poorest household is at the bottom of quartile 1, and the richest households located at the top of quartile 4.

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[20] Food energy requirements derived from 1985 WHO reference standards (ibid).
[21] Food energy requirements derived from 1985 WHO reference standards (ibid).

Annex 4: Items included in the Standard of Living Threshold calculation

Description	Scope	Gender	Cost/Year
Body oil	Household	All	1200.00
Clothes, Adult [15-101 years]	Person	Female	2200.00
Clothes, Child [3-14 years]	Person	Female	1000.00
Clothes, Adult [15-101 years]	Person	Male	1800.00
Clothes, Child [3-14 years]	Person	Male	1000.00
Cooking oil	Household	All	600.00
Electricity	Household	All	450.00
Paraffin	Household	All	100.00
Primary school cost [6-16 years]	Person	Female	900.00
Primary school cost [5-16 years]	Person	Male	900.00
Salt	Household	All	300.00
Soup	Household	All	200.00
Sugar	Household	All	1200.00
Water	Household	All	2000.00

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