

# Promoting Food Security in South East Liberia through Commercial Rice Value-Chain Development

*Summary Report*



**Oxfam GB**  
**Livelihoods Outcome Indicator**

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Photo credit: Ruby Wright

## **Executive summary**

Under Oxfam Great Britain's (OGB) Global Performance Framework (GPF), sufficiently mature projects are being randomly selected each year and their effectiveness rigorously assessed. Liberia's Promoting Food Security in South East Liberia through Commercial Rice Value-Chain Development (LIBA72) was randomly selected for an Effectiveness Review under the livelihoods thematic area. This project was implemented from 2008 to 2011, and the activities have since been expanded under a subsequent project (LIBA82). In 2010 and 2011, the project's focus was to support 2,000 members of the Amenu Farmers' Cooperative to develop paddy fields and provide them with training, inputs and technical support to bolster rice production. An additional aim of the project was to develop the capacity of the Amenu Farmers' Cooperative to process and market the produced rice on behalf of its members.

The project targeted Amenu cooperative members in 15 villages located in Grand Gedeh County, in the south east of Liberia. The Effectiveness Review used a quasi-experimental evaluation design to assess the impact of the activities on those who participated in the project activities in 2010 and 2011. The outcome measures assessed include those related to the adoption of preferred agricultural practices, agricultural production and profits, as well as household consumption, wealth status, and food security. A sample of participants who enrolled in the subsequent project in 2012 were also interviewed, to function as a comparison group. For this reason, the outcome measures relating to agricultural production and sales refer to the harvest of 2011, before these newer participants were enrolled.

Surveys were carried out with a total 756 of the project participants, 387 of whom participated in the project in 2010 and 2011, and 343 of whom have participated in the newer project from 2012 onwards. The statistical tools of propensity-score matching and multivariate regression were used to control for baseline and demographic differences when making comparisons in outcome measures between the older and newer project participants.

The results provide evidence that the project was successful in encouraging the adoption of some improved agricultural techniques, including irrigation, seed testing and multi-cropping. However, there was no indication that the project had led to a reduction in the use of slash-and-burn farming.

Those who had participated in the project during 2010 and 2011 harvested significantly larger quantities of rice in 2011 than those who were not participating in the project at that time. However, this increase in rice production seems to have been accompanied by lower production of other crops, particularly corn and vegetables. Overall, it is not clear that the total value of crops harvested by the project participants in 2011 was any greater than that harvested by the non-participants. It should also be noted that only a small proportion of the rice harvested by project participants was brought to market, and that overall crop sales were no higher among participants than non-participants. As a result, there is no indication that households that participated in the project were any better off than the non-participants in terms of food security, household income, or other indicators of material wellbeing.

In order to take forward learning from this project, Oxfam in general and the Liberia country team and partners in particular, are encouraged to consider the following:

- Investigate if there are any marketing constraints among those beneficiaries that are managing to generate surplus rice yields.
- Review protocols for selecting project beneficiaries in the future to ensure that the right households get targeted for support.
- In cases where demand for project support is significantly greater than the numbers that can be served at one time, consider allocating such support through a lottery approach.

## Introduction and purpose

Oxfam Great Britain (OGB) has put in place a Global Performance Framework (GPF) as part of its effort to better understand and communicate its effectiveness, as well as enhance learning across the organisation. As part of this framework, modest samples of sufficiently mature projects (e.g. those closing during a given financial year) are being randomly selected each year and rigorously evaluated. One key focus is on the extent they have promoted change in relation to relevant OGB global outcome indicators.

One of the projects randomly selected for the Effectiveness Review under the livelihoods thematic area in 2012/13 is the project entitled 'Promoting Food Security in South-East Liberia through Commercial Rice Value-Chain Development' (LIBA72). This project was implemented from 2008 to 2011, and aimed to support 2,000 members of the Amenu Farmers' Cooperative in developing paddy fields and to provide them with training, inputs, and technical support to bolster rice production. An additional aim of the project was to also develop the capacity of the Amenu Farmers' Cooperative to process and market the produced rice on behalf of its members. At the time of the Effectiveness Review, 1,284 farmers had benefited from developed paddy land distribution, under both the original project and under a newer project (LIBA82) which since 2012 has expanded this work. The aims of the project were to begin to address the deficit in Liberia's domestic rice production, to increase food security of the project participants, counter the effects of erratic rainfall and control pests, and also as a more sustainable approach to increasing future food security for Liberia.



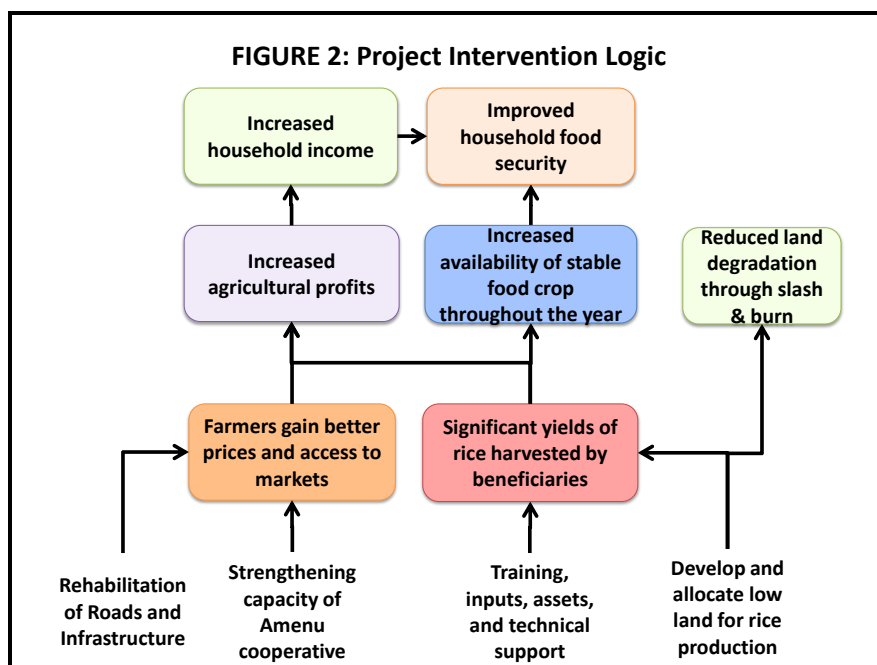
**Figure 1: Map of Liberia showing Grand Gedehe County, where the project was implemented.**

## Intervention logic of the project

The primary aim of the project assessed under the Effectiveness Review was to improve household income and food security. Figure 2 (below) presents the intervention logic of how the activities carried out under the project were to achieve these particular aims. The diagram was developed in consultation with programme staff.

As is evident from the diagram, land was to be developed for rice paddy cultivation and allocated to Amenu cooperative members, coupled with the provision of relevant training, agricultural inputs, assets and technical support. This was intended to both bolster rice production and reduce land degradation occurring through slash-and-burn agriculture, a practice typically associated with upland farming in the region. Increased crop yields of rice, the staple food crop of the region, were, in turn, to improve food security by ensuring that households had access to rice throughout the year.

At the same time, efforts were to be made to both strengthen the capacity of the Amenu Farmers' Cooperative and rehabilitate roads and other infrastructure, e.g. bridges. All this was part of an effort to ensure that cooperative members would gain better prices for their surplus rice and better access to markets. This was, in turn, intended to bolster agricultural income, thereby both increasing overall household income and improving household food security.



## Evaluation approach

The project, as implemented in Grand Gedeh County, aimed to improve the livelihoods of 2,000 rice farmers. Under its Effectiveness Reviews, Oxfam GB is evaluating projects such as this by adopting quasi-experimental evaluation designs, in which outcome measures are considered for a sample of project participants and for a group of suitable non-participants, while statistically controlling for measured differences between intervention and comparison groups. Usually this design involves identifying a comparison group from areas or communities where the project was not implemented. In this case, there were no communities within Grand Gedeh County suitable for comparison purposes. The communities that were available – particularly those that had not been targeted by the same intervention by other NGOs – were considerably more remote, and were therefore not considered to be an appropriate comparison.

Fortunately, another possibility for making a comparison was available. Since the participants in the newer project (LIBA82) had only just harvested their first yields of lowland rice following their participation in the project, or were in the process of doing so, they were thought to form an appropriate comparison group. Provided that the participants in the original project and in the newer project are otherwise comparable, the differences between them in outcome measures should provide an estimate of the impact of the project.

Data were collected from project participants in all 15 communities targeted by the original project in 2010 and 2011, as well four new communities, targeted under the newer project. A total of 756 households were interviewed across the 19 communities. Of this total number of households, 397 participated in the original project, and are referred to in this report as the ‘original’ or ‘older’ participants. The remaining 343 households interviewed have participated in the newer project only, starting in 2012, and so are referred to as the ‘newer’ participants.

Since some of the ‘newer’ participants interviewed for comparison purposes came from the same communities as the original participants, it is important to be aware of the possibility that they may have benefited indirectly from the project activities during the first phase. For example, if those who were participating in the project had passed on some of the knowledge they had gained under the project about improved agricultural techniques to those who were not yet participating in the project, the difference between them in terms of






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the outcome measures observed in this Effectiveness Review would be under-estimated. For this reason, the analysis of each of the outcome measures was carried out using *both* the full comparison group (including those newer participants who come from some of the same communities as the older participants) and a restricted comparison group, made up only of participants from the four communities where implementation began in 2012. The outcome estimates derived did not depend to any significant extent on which of these two groups was used for comparison.

At the analysis stage, propensity-score matching (PSM) and multivariable regression were used to control for measured differences between the supported and comparison producers that were interviewed.

### Impact assessment summary table

The following summary table provides a snapshot of the key findings of the Effectiveness Review. A short narrative description related to each outcome then follows to unpack each key finding. A separate full report is also available that provides a more detailed and technical description of the evaluation design, process, and results. The table below summarises the extent to which there is evidence that the project realised its targeted outcomes in the form of a simple five-point ‘traffic light’ system. The key to the right presents what the various traffic lights represent.

-  Evidence supporting large impact
-  Evidence supporting more modest impact
-  Evidence of large impact, but only for specific sub-groups/measures
-  Evidence of modest impact, but only for specific sub-groups/measures
-  No evidence of impact

Outcome/Impact	Rating	Short commentary
<b>Outcome 1</b> – Adoption of preferred agricultural practices		There is evidence that the project succeeded in encouraging the adoption of some improved techniques. However, few participants reported engaging in multi-cropping, and slash-and-burn agriculture continues to be a problem.
<b>Outcome 2</b> – Increased rice production		The older participants harvested significantly more rice in 2011 than those who were not participating in the project at that time.
<b>Outcome 3</b> – Increased overall agricultural production and profits		The overall value of crops harvested and the revenue generated by crop sales in 2011 was approximately the same among those who had been participating in the project and those who were not at that time.
<b>Outcome 4</b> – Improved household food security		There is no evidence that the interventions had an effect on household food security on any of the measures used.
<b>Outcome 5</b> – Increased household income		There are no positive differences found between the older and newer project participants in terms of household consumption or other indicators of material wellbeing.

**Applicability:** These results apply to those who participated in the LIBA72 project in 2010 and 2011. Results on agricultural production and sales relate to the harvest of 2011, and do not reflect any further changes that may have occurred since that time. The results do not apply to the activities of the more recent food security project being implemented in Grand Gedeh County (LIBA82).

## Impact assessment findings

### Outcome 1 – Adoption of preferred agricultural practices

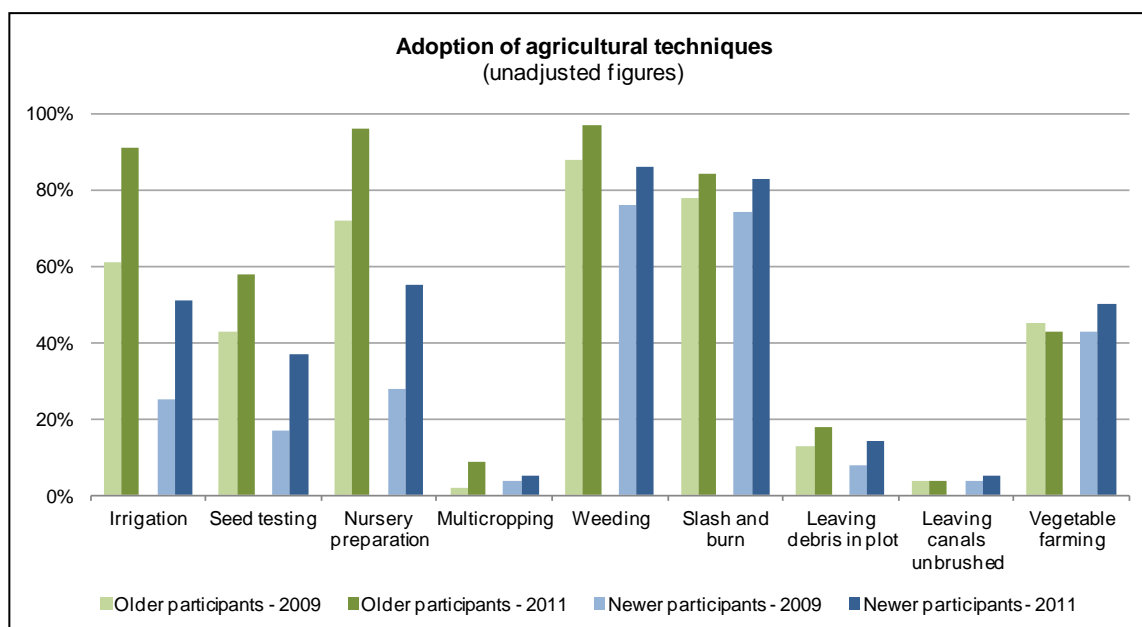
A

Survey respondents were asked whether they were using particular agricultural practices that were either being encouraged or discouraged by the project, both in 2009 and in 2011. The resulting figures are shown in the chart below.

As is clear, a larger proportion of the older project participants reported employing irrigation, seed testing, nursery preparation and leaving debris in plots than the newer participants, both in 2009 and 2011. After adjusting for the differences at baseline, the adoption of these practices was found to have increased more among those who were participating in the project during that two-year period than among the newer participants.

It should be noted that very few households reported harvesting rice from the same field on more than one occasion in a year (multi-cropping). Creating the potential for multi-cropping through irrigating paddy land was one of the main ways the project sought to bolster rice production – but in fact the construction of dams and irrigation facilities had not yet been completed in 2011. These works have since been carried out under the newer project (LIBA82), although it is believed that cultural issues are still a barrier to the adoption of multi-cropping.

Large majorities of both older and newer participants reported practising weeding (a good practice) and slash-and-burn agriculture (a bad practice) in both 2009 and 2011. The latter is of particular interest: encouraging households to engage in intensive lowland rice cultivation was expected to lead to a reduction in slash-and-burn agriculture. This does not appear to be the case: in fact, there is some indication that the proportion of the older project participants engaged in slash-and-burn agriculture may have increased faster during the 2009–11 period than the proportion of the newer participants (although it is not clear that this difference is statistically significant). This may be worrying, but it should be noted that the survey question required a simple yes or no response about whether the household used each technique, so it is still possible that engaging in lowland rice farming led to a change in the *area* of land slash-and-burn agriculture is practised on. Further investigation and continued monitoring will be required to establish whether the promotion of lowland rice



production has in fact resulted in the expected reduction in slash-and-burn farming, or will do so in time.

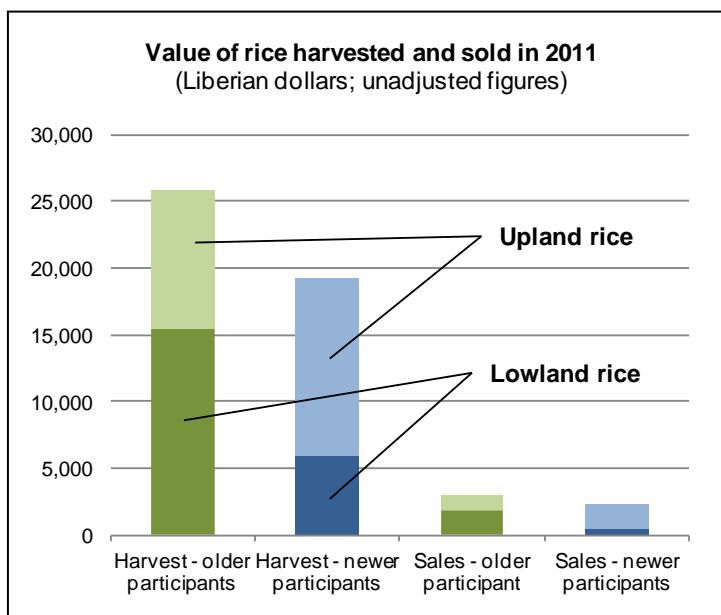
The right-hand side of the chart illustrates that the proportion of newer participants engaged in vegetable production increased significantly between 2009 and 2011, but that this did not happen among those who were participating in this project during that period. Of course, it is not surprising that, if the project had encouraged the original participants to engage more intensively in lowland rice production, then they may have invested less in other livelihoods activities – of which vegetable farming appears to be one.

**Outcome 2 – Increased rice production**



In the course of the survey, respondents were asked for details of the various crops they had cultivated in 2011 – including lowland rice, upland rice and other crops. As can be seen in the chart below, those who had been engaged in the project during 2010 and 2011 produced much larger quantities of lowland rice (the darker-coloured section of the bars) than did those who had yet to be enrolled in the project. The volume of upland rice was lower in that year among the older participants than the new participants, but the older participants do appear to have harvested significantly more rice than the newer participants in total, at least as measured by value. There is a similar positive difference between the older and newer participants in terms of their ‘profit’ from rice production in 2011, measured by deducting respondents’ estimates of the expenses incurred in rice production from the market value of the rice they harvested.

As discussed above, some of the activities of the project were aimed at facilitating access to markets, with the intention that producers would be able to sell rice surplus to their own needs. To that end, respondents were asked not only about the quantities of rice which they had harvested, but also about the quantities sold during 2011. The resulting figures are shown in the two bars on the right-hand side of the chart. The first interesting observation is that only a quarter of respondents reported having made any sales of rice during 2011, and this figure was not significantly different between the older and newer participants.



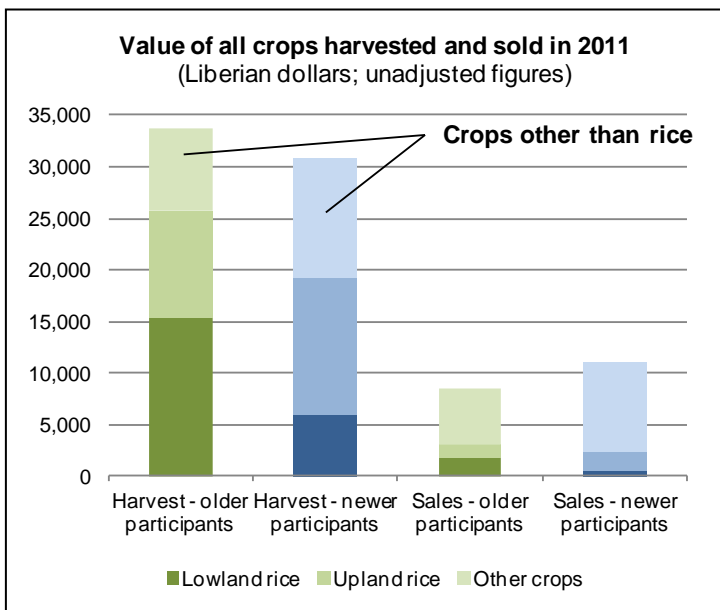
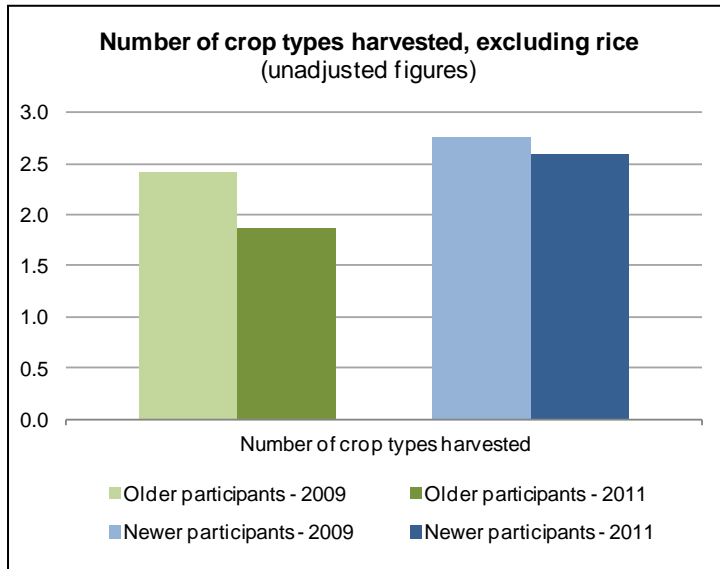
Those who were participating in the project at this stage sold an average of 2.4 bags of rice in 2011, from a harvest of 22.1 bags on average. There is some evidence that the value of rice sales was higher among the older participants than the newer participants that year – but it is not clear that this difference is statistically significant, so it should not be treated with confidence.

**Outcome 3 – Increased overall agricultural production and sales**



From the results examined under Outcome 2, it is clear that project participants invested in production of lowland rice, and were thereby able to increase their production of rice significantly in 2011. Of course, this does not present a full picture of the impact of the project. For example, it is important to understand whether participants' focus on rice

production led to changes in the production of other crops. The first chart shows that the project appears to have had some effect on the *number* of other crops produced. The newer participants (who had not yet begun participating in the project) cultivated approximately the same number of crop types in 2009 as in 2011, but the older project participants cultivated fewer crop types in 2011 than in 2009.. Examination of the underlying data shows that the older participants were particularly likely to have cut out their cultivation of corn (the proportion of project participants who harvested corn reduced from 32 per cent to 25 per cent between 2009 and 2011), as well as of cassava and perhaps okra, eggplant and other vegetables.



The second chart shows the consequence of this on overall agriculture production. This chart includes the same information on rice production and sales as the chart under Outcome 2, but adds the value of production and sales of all other crop types. It can be clearly seen that, although the value of rice harvested by the older participants in 2011 was considerably higher than among the newer participants, the value of

other crops they harvested (the top portion of each bar on the chart) was smaller. Overall it is not clear that the value of crops harvested by the older participants in 2009 is significantly higher than that harvested by the newer participants, even though a greater portion of that total is made up from rice. The total value of crops sold (the bars on the right-hand side of the chart) is in fact lower among the older participants – but again this difference is not statistically significant, so should be treated with caution.

It should be noted that, by the time of the Effectiveness Review, the original project's exclusive focus on rice had already been identified by the implementers as a weakness. The current project being implemented in Grand Gedeh County (LIBA82) includes support to



producers not only in rice production, but also in complementary crops, particularly vegetables.

**Outcome 4 – Improved household food security**



Three measures of household food security were examined in the Effectiveness Review. One module in the questionnaire was based on a scale that combines the Household Food Insecurity Access Scale (HFIAS) developed by USAID’s Food and Nutrition Technical Assistance (FANTA) Project and the ‘reduced’ version of the Coping Strategies Index. This module involved asking the respondents whether they experienced any of the following and, if so, the number of times:

- In the last seven days did you or any one in your home have to:*
1. *Cut down the size of a meal because there was not enough food?*
  2. *Eat fewer meals in a day than normal because there was not enough food?*
  3. *Lessen the amount of food eaten by adults in order for small children to eat?*
  4. *Borrow food or rely on help from a friend or relative because there was not enough food?*
  5. *Go to sleep at night hungry because there was not enough food?*
  6. *Go for a whole day or night without eating because there was not enough food?*

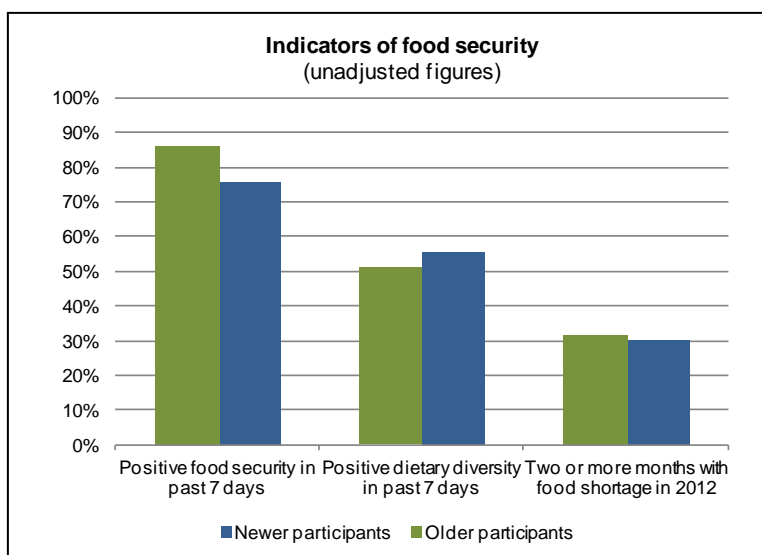
A household was coded as having positive food security if it reported experiencing any of the first three food security problems no more than once during the previous seven days, and did not experience any of the other three problems at all. The vast majority (81 per cent) of households surveyed met this benchmark for positive food security – this is not surprising, since the survey was conducted shortly after the main harvest season.

To derive a measure of households’ dietary diversity, respondents were also asked about the number of times various food items were consumed during the past seven days. A household was coded as having a sufficiently diverse diet if they reported having consumed during the past seven days:

1. *A source of protein at least four times.*
2. *Dark leafy vegetables at least three times.*
3. *Other vegetables and fruits at least three times.*
4. *A carbohydrate source at least seven times.*

Finally, the respondents were asked whether there were any times during 2012 where their households did not have enough stable foods – such as rice or cassava – to eat. If they responded in the affirmative, they were then asked to specify which months in particular.

This chart compares the results of the two groups on binary measures constructed from household food security data that were collected. While



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the chart shows some differences in the proportions of the older and newer participants who demonstrate food security, none of these differences appear to be statistically significant after controlling for demographic and baseline differences. This means that there is no evidence that the project led to an improvement in food security among the original participants – or at least not to an extent that was still apparent at the time the survey was carried out.

### Outcome 5 – Increased household income

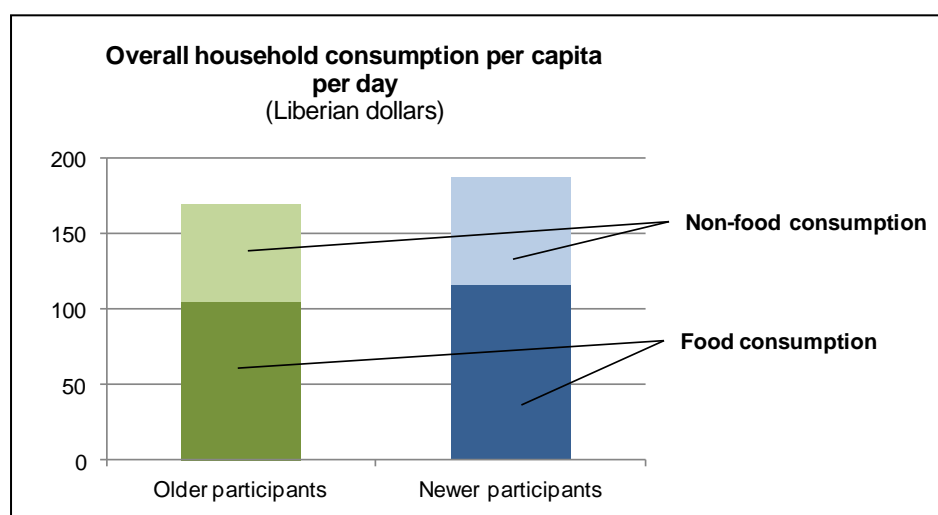
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The indicators examined under Outcome 3 – production and sales of agricultural products – do not provide a full reflection of the project's impact on overall household income. Most of the households surveyed reported that they are engaged in various livelihood activities other than agriculture, such as rearing livestock, running a household business, or carrying out waged labour. A direct measure of household income would have to collect detailed information about earnings from each of these activities, which would be complicated and prone to error. Instead, the survey used for the Effectiveness Review followed common practice in collecting data on household consumption to serve as an indicator of income.

To construct a measure of household consumption, respondents were asked to estimate their household's food consumption and recent non-food expenditure, including:

- The value of all food that had been consumed in the household in the previous seven days.
- The amount spent on most common types of regular expenditure (including transport, communications and cosmetics) in the month prior to the survey.
- The amount spent on less-common expenditure types, such as health costs, school costs and investments over the 12 months prior to the survey.

This information was aggregated and divided by the number of household members (with adjustments made for children and some allowance for economies of scale) in order to calculate per-person per-day expenditure for the household.



The results are shown in the chart. Unfortunately household consumption appears to have been no greater among the older participants than among the newer participants at the time of the survey. In fact, there is some evidence that food consumption was *lower* among the older participants – though the same does not apply to non-food consumption.

It should be recalled that the survey was conducted in January 2013, by which time the 'newer' participants had been engaged in the project for more than 12 months. The majority of these newer participants had, by that time, already harvested rice that was cultivated as part of the project. If the project had been successful in improving their returns from that harvest, then that may have led to immediate increases in their consumption – either through

the consumption of the harvested rice, or through increased consumption of other goods after selling harvested rice. The lack of a result in terms of household consumption in January 2013 may therefore reflect that the newer participants (being used for comparison purposes) had already increased their consumption as a result of the project. This was investigated by restricting the analysis specifically to those newer participants who had not yet harvested any rice grown since their engagement with the project began. There was still no evidence of a positive difference between the older and newer participants on household consumption under this revised model, suggesting that the most recent harvest cannot explain the lack of a difference between the two groups.

This lack of impact in terms of household consumption is corroborated by two other measures collected in the survey. Firstly, respondents were asked for a subjective assessment of their household's ability to meet basic needs. Most respondents described their household as either 'breaking even' or 'doing well', but there was no difference in these proportions between the older and newer participants. Secondly, data on wealth indicators, such as housing conditions and ownership of livestock, productive assets and household goods, was used to construct an index of material wealth for each household, both at the time of the survey and for a reconstructed baseline in 2009. On this index, the older participants tended to be better off at baseline according to the data recalled from 2009. Surprisingly, this situation was reversed by the time of the survey, with the newer project participants having a higher wealth index score.

## **Programme learning considerations**

The findings of this Effectiveness Review provide a good basis for learning and critical reflection. Oxfam in general, and the Liberia country team and partners in particular, are encouraged to consider the following:

- *Investigate if there are any constraints which prevented project participants bringing their rice to market in 2011.*

Rice sales were reported to be very low among both the older and newer participants in 2011. Was this also the case in 2012? Is low production the only reason why sales of rice were low, or are there other constraints? Given that the Amenu Farmers' Cooperative, at least at the current time, is certainly not in a position to market rice on behalf of all the producers targeted by the product, it is critical that they will be able to access markets and obtain fair prices for any surplus rice that is produced.

- *Review protocols for selecting project participants in the future to ensure that the right households are targeted.*

There was clearly significant (and probably undesirable) bias in the process of selecting participants for the original project. These earlier participants already had developed paddy land, so it is unclear why they were chosen by the village leaders to receive more land – particularly when there were many households in the same villages that had none. In the villages where there is a mix of both older and newer participants, the former were wealthier than the latter to begin with, so it is unclear why they were prioritised to receive support. While it is certainly good practice to involve local leaders in beneficiary targeting processes, it is critical to put in checks and balances to ensure that the right households end up being targeted, and to avoid the possibility of elite capture.

- *In cases where demand for project support is significantly greater than the numbers that can be served at one time, consider allocating such support through a lottery approach.*

It is clear that the project could not target all those in the villages eligible to receive developed paddy land in during 2010 and 2011. In such cases, it may serve well to pursue either the over-subscription or randomised phase in impact evaluation designs. The former involves profiling all potentially eligible households and then randomly choosing who is to benefit from the project. Given that there are not sufficient resources to support everyone, this is a fair and, if done publically, transparent way of selecting participants for a project. If the participant group is selected randomly, those that were not selected serve as an ideal comparison group, since they will be comparable in both measured and unmeasured ways, on average, to the project's participants.

The randomised phase-in design is another option when all eligible households will ultimately participate in the project. It involves choosing who will first be supported by the project, while the others will be placed on the waiting list. Those on the waiting list can also serve as an ideal comparison group for evaluation purposes because they would be comparable in every way to the first cohort of project participants.