



# Improving Socio Economic Conditions of Paddy Farmers in East Sri Lanka Project Effectiveness Review

## *Summary Report*



**Oxfam GB  
Livelihoods Outcome Indicator  
August, 2013**

### **Acknowledgements**

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Photo: Abir Abdullah

## Executive summary

Under Oxfam Great Britain's (OGB) Global Performance Framework, mature projects are being randomly selected each year for a rigorous assessment of their effectiveness. The project 'Improving Socio-Economic Conditions of Paddy Farmers in East Sri Lanka' was one of those selected for an effectiveness review in the 2012/13 financial year. This was a five-year project, implemented from 2009 to 2013 in partnership with three organisations – Eastern Self-reliant Community Organisation (ESCO), Social Welfare Organisation Ampara District (SWOAD) and Sarvodaya, which aimed to contribute to conflict mitigation and recovery in the north and east districts of Sri Lanka. Specific project activities included renovation of large-scale infrastructure, such as rehabilitation of dams and irrigation schemes. This was supported by interventions to positively affect the paddy value-chain, such as establishing producer organisations, improving access to value-added processing (such as milling or seed-grading), promotion of organic fertilisers and crop insurance. Together with agricultural support, associated interventions related to improving access to services that aim to reduce gender-based violence, and interventions aiming to improve hygiene practice, were also implemented. This effectiveness review particularly covers the results related to the first outcome, which is linked to the direct livelihood and infrastructure support provided to 33 communities in Ampara and Batticaloa districts.

The effectiveness review adopted a quasi-experimental impact evaluation design, which involved comparing households that had been supported by the project with households in neighbouring communities that had similar characteristics at baseline in 2008. A household survey was carried out with 410 households directly supported by the project and 486 comparison households. At the analysis stage, statistical tools were used to reduce bias in making comparisons between the supported and comparison households in terms of the various outcome indicators. The outcomes assessed included those related to the adoption of improved agricultural practices, production and sales of agricultural products, household income and wealth status, access to legal services and measures of household hygiene practice.

The survey data provide evidence that supported households have, on average, adopted improved production techniques at greater rates than the comparison households, and during 2012/13 produced and sold larger quantities of paddy and other crops than comparison households. This increase in sales appears to have led to a significant increase in overall household income. Household income is estimated to be approximately 8 to 10 per cent higher than it would have been without the project; the boost to income among supported households in Batticaloa is slightly greater. Other related measures, such as the analysis of changes in household asset ownership, make it apparent that there is more robust evidence that the project has successfully affected household income and wealth among supported households in Batticaloa district. In terms of food security, there is evidence that the project has successfully affected the availability of rice among supported households in Ampara district. While there is no evidence of an increase in the security of rice availability in Batticaloa, there is evidence that supported households have a more diverse food and crop base than those in Ampara. This latter point may also explain the fact that supported households in Batticaloa have greater dietary diversity. Finally, there is also evidence of a positive project effect on associated project objectives including awareness of how to access services for victims of gender-based violence, as well as legal services related to land and property rights.

While the majority of the findings of the effectiveness review are positive, there are additional lessons emerging from the results that can be applied to other projects of this type in Sri Lanka and elsewhere. The Sri Lanka country team and the project team in particular are encouraged to consider the following:

- *Investigate the reasons for the differences in impact on several measures between supported households in Ampara and Batticaloa districts.*

## Improving Socio-Economic Conditions of Paddy Farmers in East Sri Lanka

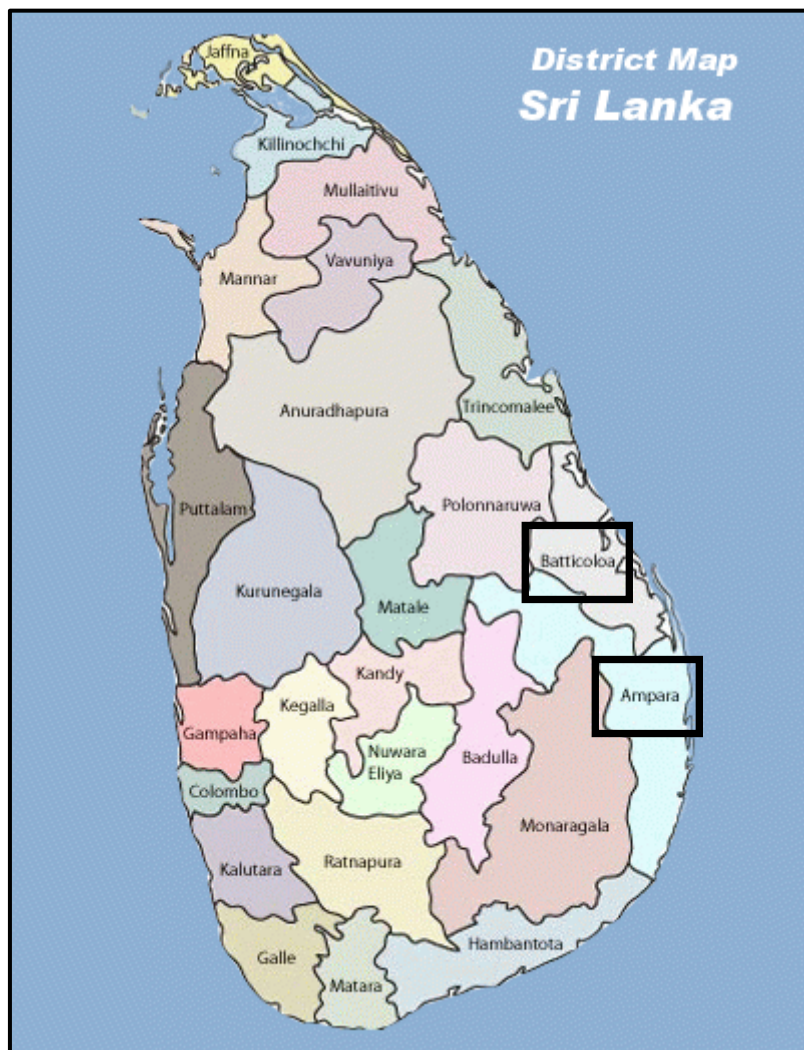
- *Follow up with supported rice-producers in Ampara to identify where greater successes in increasing rice production have been realised.*
- *Consider exploring in more detail how the project has affected supported households in relation to gender-based violence and legal rights (e.g. property and land rights).*

## Introduction and purpose

Oxfam GB 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 mature projects (e.g. those closing during a given financial year) associated with each thematic indicator area 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 Sri Lanka's 'Improving Socio-Economic Conditions of Paddy Farmers in East Sri Lanka'. The effectiveness review which took place in Ampara and Batticaloa districts in March 2013 intended to evaluate the success of the project in strengthening livelihoods among supported households. Although the project was also implemented in Vavuniya district, this area was not included in the review due to security restrictions. Therefore the focus of the review was on the 33 communities in Ampara and Batticaloa districts supported by the project through to its completion in March 2013. The project activities were implemented by three local partner organisations – ESCO, SWOAD and Sarvodaya.

Figure 1: Location of Project Effectiveness Review



The expected outcomes of the project included:

- Internally displaced people (IDP), returnees and host community families to have access to infrastructure and enhanced capacity to significantly improve their household income and food security.
- IDPs, returnees and host community families to have increased access to water and sanitation infrastructure and be protected from water-borne diseases.
- Improved protection and reduced gender-based violence for 57,000 target women and men from IDP, returnee and host community families.

This effectiveness review particularly covers the results related to the first outcome, which is linked to specific project activities including renovation of large-scale infrastructure, such as rehabilitation of dams and irrigation schemes. This was supported by interventions to positively affect the paddy value-chain, such as establishing producer organisations, improving access to value-added processing (such as milling or seed-grading), promotion of organic fertilisers and crop insurance. Together with agricultural support, associated interventions related to improving access to services that aim to reduce gender-based violence, and interventions aiming to improve hygiene practice, were also implemented.

## **Evaluation approach**

The 'Improving Socio-Economic Conditions of Paddy Farmers in East Sri Lanka', implemented in Ampara and Batticaloa districts, attempted to strengthen the livelihoods of households living in 33 communities across these two districts (see Figure 1 above).

From a rigorous impact evaluation perspective, the best way to evaluate such an intervention would have been to restrict the project's implementation to randomly selected geographical areas, leaving other sites for comparative purposes, i.e. as controls. This impact evaluation design is known as a clustered randomised control trial. If it was successfully implemented, the impact of the project could have been assessed by directly comparing the households of the intervention and control sites in relation to relevant measures of outcome. This is specifically because the randomisation process would have made the households in the two sites comparable in every way, save their participation in the project.

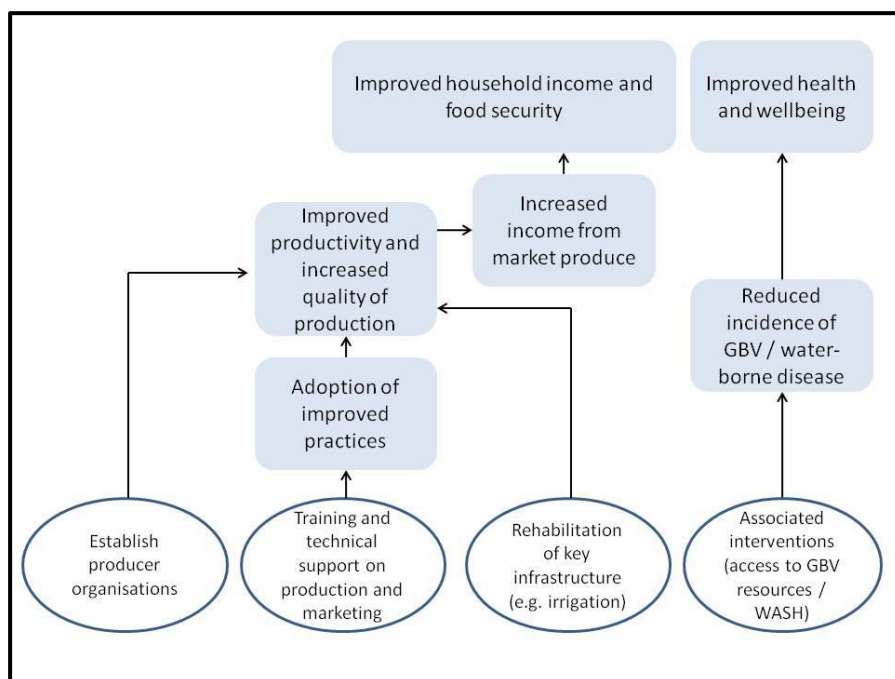
However, Oxfam and its district partners did not implement the project in randomly selected geographic areas; the communities were purposively chosen. An alternative impact assessment design was consequently pursued. This design is referred to as a quasi-experiment because it attempts to 'mimic' what a randomised control trial does by purposively identifying a comparison group that is similar to the intervention group, and then statistically controlling for any measured differences between the two.

To implement the design, communities in Ampara and Batticaloa districts, where the project was implemented and not implemented were mapped out. A total of 896 households were interviewed, including 410 from 27 communities that had participated in the project, and a further 486 from 12 communities selected as appropriate for comparison. To reduce bias, propensity-score matching (PSM) and multivariable regression were used in the statistical comparison of these two groups.

## **Intervention logic of the project**

Figure 2 shows a simple diagram of the theory of change behind the project activities. The project's overall objective was to improve household income and food security, together with improving the health and overall wellbeing of the supported population.

Figure 2: Project theory of change (simplified)



The rehabilitation of key infrastructure was intended to improve both the production and income received from selling of agricultural products. For example, in some communities significant work had been undertaken to repair and rehabilitate existing dams and irrigation schemes. The aim of this was to permit an increase in the growing season for paddy farmers in order to generate additional harvests and thus greater income and food security. Additional infrastructure works, including renovation of key access routes, were intended to improve farmers' access to markets and suppliers.






Together with the larger-scale infrastructure works, the project also established and supported existing producer organisations and 'self-help groups'. The project also encouraged linkages between these producer groups in order that they may have greater leverage in dealing with purchasers and suppliers, as well as in challenging wider government policy.






















These producer organisations were also the focus for agricultural training, such as in the development of organic fertilisers, market gardening, and improving the quality and quantity of agricultural produce more generally. Certain groups were provided with larger-scale agricultural machinery, such as tractors, milling machines and seed-grading processors, in order that they may benefit from associated value-added processes. Other groups also acted as a savings group and a focus for related training on income-generating activities and livestock rearing.

A number of additional interventions were also implemented that specifically targeted gender-based violence and water-borne disease. Key activities included promoting awareness among supported communities of how people could access relevant services for victims of gender-based violence, and promotion of better hygiene – including water treatment and hand-washing behaviour. The aim of these activities was to contribute to a reduction in gender-based violence and water-borne disease, thus improving wider aspects of individual wellbeing.

## Summary results 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, more technical 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 below illustrates 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	Overall	Ampara	Batti	Short Commentary
<b>Outcome 1</b> – Adoption of improved production techniques				Rates of adoption of improved production techniques were generally higher among the project participants than among comparison households.
<b>Outcome 2</b> – Revenue generated from paddy cultivation activities				Considerably greater production and sales of paddy in 2012/13 by project participants compared to comparison households, resulting in significantly greater revenue being generated by the average participant household.
<b>Outcome 3</b> – Improved household income				Household income is estimated to be approximately 8 to 10 per cent higher than it would have been without the project; the boost to income among supported households in Batticaloa is slightly greater.
<b>Outcome 4</b> – Increased food diversity and security				Evidence of a significant increase in food diversity in Batticaloa, but no increase in rice availability. Evidence of a marginal increase in rice availability in Ampara, but no changes in food diversity.
<b>Outcome 5</b> – Increased asset wealth				Evidence of a significant increase in asset ownership since 2008 among the supported households in Batticaloa. No corresponding increase among supported households in Ampara district.
<b>Outcome 6</b> – Increased awareness of how to access legal services				Project participants exhibit significantly greater awareness of how to access services for victims of gender-based violence, as well as legal/referral services related to land and property rights.
<b>Outcome 7</b> – Improved household hygiene behaviour				Evidence of significant increases in the proportion of supported households in Batticaloa treating their drinking water, and reporting improved hand-washing behaviour.

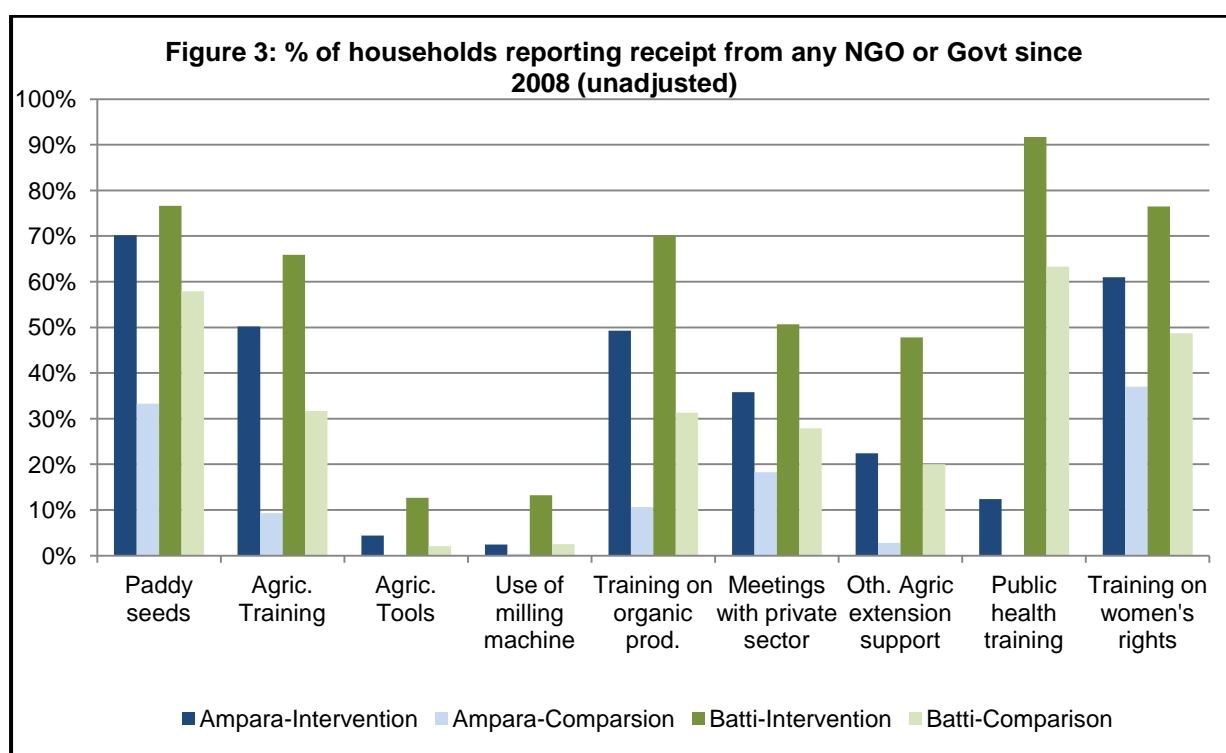
## Impact Assessment findings

This section will examine the differences between the households supported by this project and the comparison households in terms of various outcome measures corresponding to steps in the logic model presented above. We will start by examining differences in terms of the various interventions received by supported households, moving on to investigate adoption of improved practices and use of inputs, then will investigate differences in the quantity and value of households' production, household income, food security, indicators of household wealth, and finally indicators related to access to information regarding gender-based violence and property rights, as well as hygiene practice in the household.

### *Receipt of external support*

While more of an 'output' measure, it is important at the outset to assess supported households' exposure to the intervention – particularly as it represents the first step of the logic model presented previously.

Figure 3 presents the proportion of supported and comparison households reporting receiving various support or training since 2008 (baseline of the project).



As is immediately apparent, differences exist between the intervention and comparison households reporting receipt of various support or training. For each of the items the difference is statistically significant. It is also interesting to note the variation among the intervention households in the type of support received. For example, in both Ampara and Batticaloa districts, at least 70 per cent of supported households reported having received paddy seeds or seedlings, and at least 50 per cent received associated training on agricultural techniques, whereas 10 per cent or less of households reported receiving tools. It is also important to note that for each type of support a greater proportion of supported households in Batticaloa reported receipt. This indicates that the project may have been more intensively implemented in Batticaloa, or that supported households in Batticaloa may have had greater access to other NGO or government support. The differences between the two districts are



particularly significant in terms of public health training,<sup>1</sup> training on organic production, and access to other agricultural extension support. It is important to note the differences in exposure to these various interventions as we consider the results on the higher-level outcome measures.

## Outcome 1: Adoption of improved production techniques

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### ***Adoption of improved production techniques***

The project, through the training and ongoing support provided to participants, encouraged them to adopt specific improved techniques for increasing the quantity or quality of their production. In the course of the questionnaire, respondents were asked whether their household had applied each of the following techniques in their farming activities, both during the year prior to the survey, and at baseline in the year 2008:

- crop irrigation
- soil testing
- using organic fertilisers
- using compost or green manure
- planting cliseridia
- inter-cropping
- leaving debris in plot.

Some of these techniques are relevant to the production of specific crops (particularly paddy), while others are more generally applicable.

The first indicator of adoption of improved farming techniques to be considered is the *number* of these techniques that each household was applying. The analysis confirms that the average number of techniques applied by each of the producers during the 12 months prior to the survey is indeed higher among the supported households than among the comparison households. Households in Ampara district are estimated to apply between 1.1 and 1.3 more of the improved techniques than the average comparable household in the comparison group. The difference between the supported and comparison households in Batticaloa district is between 0.6 and 0.7 techniques.

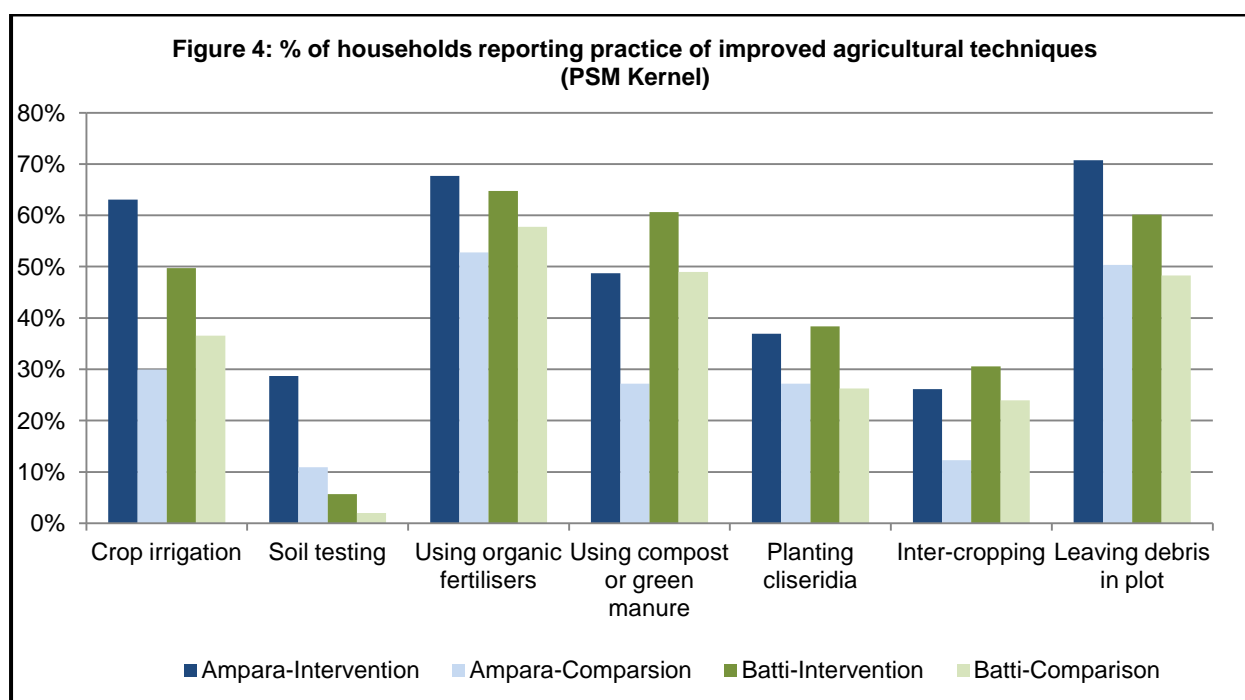
As there are some significant differences between the supported and comparison households in terms of baseline and demographic characteristics, it is important wherever possible to examine the change in outcome variables between 2008 and 2013, and whether these changes differ between supported and comparison households. These 'difference-in-difference' estimates can more reliably control for differences between the different households at baseline than by simply including the baseline value as a covariate or matching variable.

The difference-in-difference estimates for the number of improved agricultural techniques used show that the differences between the supported and comparison households are slightly smaller, but are still statistically significant. For example, households in Ampara district are estimated to have increased the number of improved agricultural techniques by between 0.4 and 0.8 from 2008 to 2013. The difference between the supported and comparison households in Batticaloa is between 0.3 and 0.4 techniques. We can therefore say there is strong evidence that the project has successfully effected the application of improved agricultural techniques.

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<sup>1</sup> Supporting evidence shows that significant WASH training was implemented in Ampara district, suggesting that there may have been misunderstanding of this particular question by the enumerator team in Ampara.

Figure 4 presents the proportion of intervention and comparison households reporting practice of the improved agricultural techniques in the year prior to the survey. It is interesting to note the variation, both between the intervention and comparison households, in the application of different techniques, and in the differences between Ampara and Batticaloa districts. In each of the techniques there are differences between the reported practice of intervention and comparison households, and in most cases these differences are statistically significant. The three improved practices reporting greatest application by intervention households are leaving debris in cultivated land, using organic fertilisers and implementing crop irrigation. Fewer households reported engaging in soil testing, inter-cropping and planting cliseridia. It is also interesting to note that supported households in Ampara were more likely than supported households in Batticaloa to irrigate their crops, test their soil, use organic fertilisers, and leave debris in their plot following harvest. Conversely, supported households in Batticaloa were more likely to use compost, plant cliseridia, and practise inter-cropping.



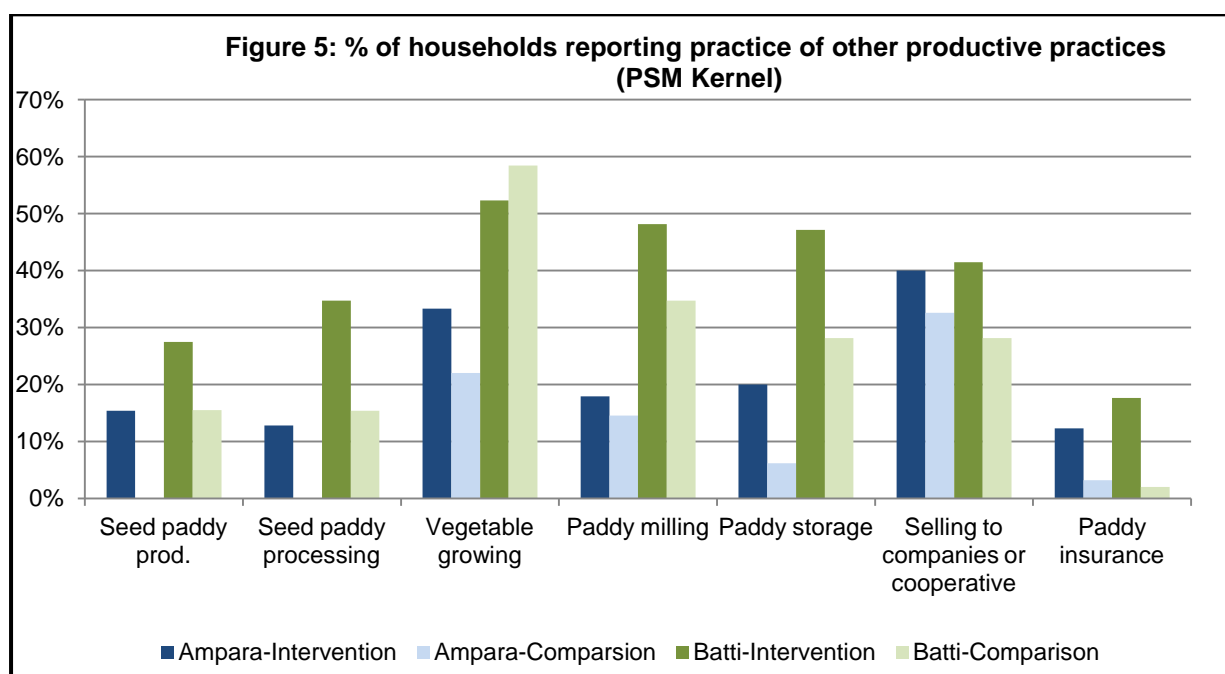
As mentioned above, given that the intervention and comparison households differed in relation to their agricultural practices at baseline, it is appropriate to analyse the change in particular practices reported between 2008 and 2013. The analysis shows that there is evidence of a 9 to 12 percentage point increase between 2008 and 2013 in the proportion of supported households in Ampara reporting use of irrigation. This difference is statistically significant, providing evidence of a positive project effect in this regard. No significant change in irrigation practice was detected for supported households in Batticaloa. Supported households in Ampara also exhibited an 11 to 15 percentage point increase in soil testing, an 11 to 17 percentage point increase in the use of compost or green manure – differences that are statistically significant. While the percentage point increases on these measures are less marked in Batticaloa, they remain statistically significant – again indicating a positive project effect on the application of these techniques.

Significant increases were also detected in Ampara in the practices of using organic fertilisers, planting cliseridia and leaving debris following the harvest. As only two of the three models estimated these increases to be significant, we can say with less certainty that there has been a positive project effect in these regards. With the exception of the use of organic fertilisers, similar positive differences exist in Batticaloa district. In both districts, there is no evidence of a change in inter-cropping practices.

### Adoption of other productivity-related practices

Respondents were also asked about a number of other productivity-related practices, and whether they practised them at baseline (2008), and in the year prior to the survey.

Figure 5 illustrates the proportion of supported and comparison households reporting practice in the year prior to the survey:



It is immediately apparent that with the exception of vegetable growing in Batticaloa district, supported households reported greater practice of these various activities than their comparators. For several of these activities, the differences are statistically significant. It is also interesting to note that in each case, supported households in Batticaloa district reported greater uptake of these practices than supported households in Ampara district.

As mentioned previously, given that the intervention and comparison households differed in relation to their productive practices at baseline, it is appropriate to analyse the change in these practices reported between 2008 and 2013. Turning our attention first to the supported households in Ampara district, the three areas where there are strongly statistically significant differences are in seed paddy production (increase of between 9 and 10 percentage points), seed paddy processing (increase eight percentage points), and vegetable growing (increase of between six and nine percentage points). Therefore, in each of these areas there is evidence that the project has successfully affected the uptake of these improved practices. There is also modest evidence among supported households in Ampara that the project has had a positive effect on an increase in the proportion of households selling their produce to companies or cooperatives. The percentage point increase is between seven and eight per cent, however, only two of the three estimation models suggest this difference is statistically significant.

In Batticaloa, it is evident that there are significant differences in four of the productivity-related practices. As is the case for supported households in Ampara district, there are significant increases in seed paddy production (between 8 and 11 percentage points) and seed paddy processing (between seven and nine percentage points). However, there is no evidence among supported households in Batticaloa of a significant increase in terms of the percentage of households growing vegetables or selling their produce to companies or cooperatives. There is evidence of a positive project effect in Batticaloa in terms of households using paddy

storage (increase of six percentage points), and interestingly a highly significant increase in the uptake of paddy insurance (increase of between 10 and 13 percentage points).

**Use of agricultural inputs**

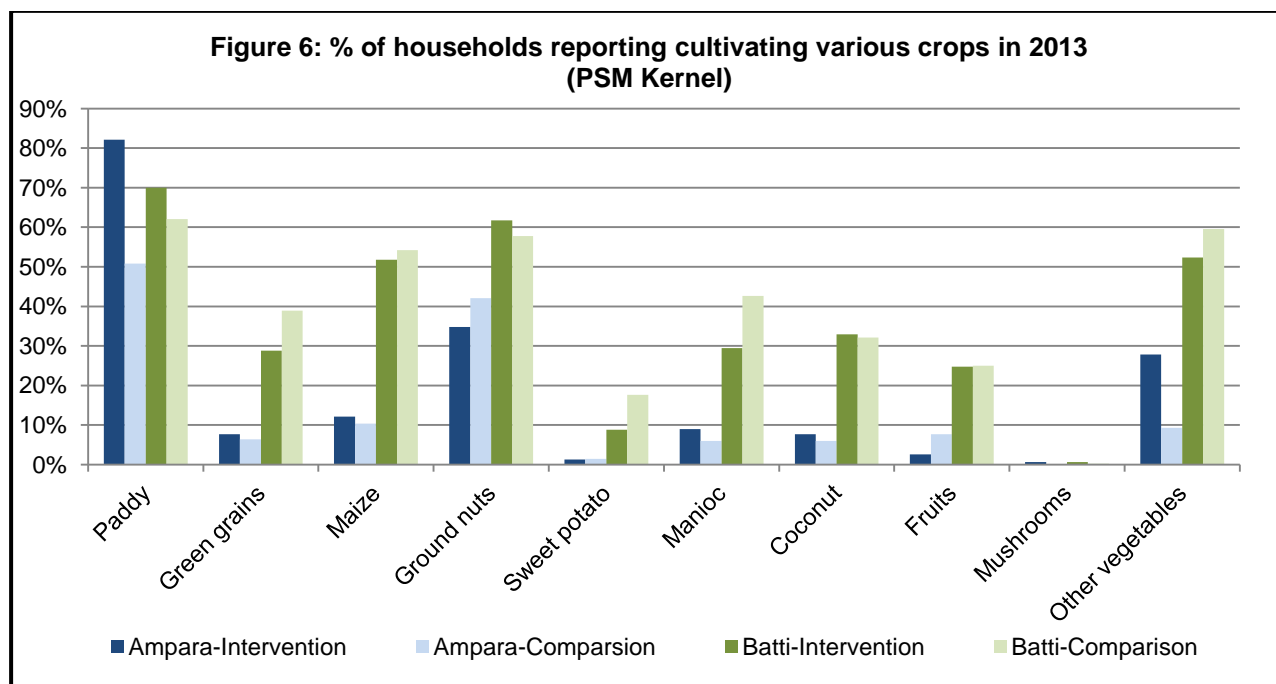
It was not feasible to include detailed information on the use of inputs in all the various productive activities in the survey. However, some basic information about the land area cultivated was included in the survey.

Although the project did not address land access directly, it is possible that improvements in productivity encouraged by the project would have led to supported households increasing the quantity of land in cultivation. The analysis shows that the supported households in Ampara on average increased their quantity of land under cultivation between 2008 and 2013 by more than the comparison households. The magnitude of the difference, at between 0.3 and 0.5 acres, is reasonably substantial, compared to the average farm size of 2.5 acres. In Batticaloa district, supported households on average increased their quantity of cultivated land by 0.6 acres more than comparison households. Again, this magnitude is quite substantial considering the average farm size of supported households in Batticaloa is 2.9 acres. As one of the project’s objectives was to bring more land into productive use, there is therefore evidence here of a positive project effect in this regard.

**Number of crops cultivated**

Before considering the production and sales of particular crops, it is important to consider the number and range of crops cultivated by supported households. Interestingly, the results show that the average number of crops cultivated in the year prior to the survey is different among supported households in Ampara and Batticaloa districts. On average, supported households in Ampara cultivated 1.6 crops, compared to 3.2 crops for supported households in Batticaloa. The results also show that there is only marginal evidence of an increase in the number of crops cultivated by supported households since 2008.

Figure 6 illustrates the proportion of households cultivating particular crops in the year prior to the survey:



The chart highlights the differences in regard to the range of crops cultivated by households in Ampara and Batticaloa districts, with supported households in Batticaloa more likely to be cultivating a greater diversity of crops than supported households in Ampara.

**Outcome 2: Revenue generated from paddy cultivation**

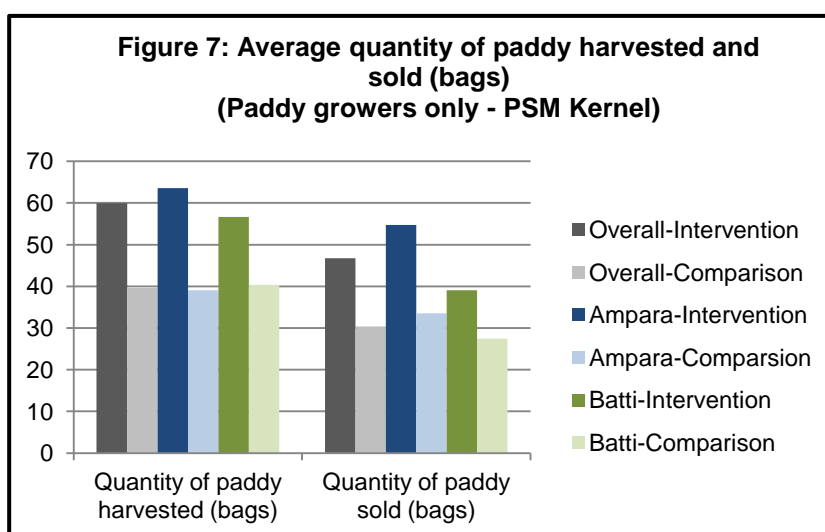


Given that the core aim of the project was to improve household food security and income by bolstering paddy production, many of the questions in the household survey were devoted to obtaining data on the latter. The respondents were asked in particular to report on the various crops they cultivated in the year prior to the survey, including the quantity harvested, their market value, production expenses incurred, and revenue earned, if any. The questionnaire was designed in such a way that data related to the production and sales of paddy, maize and other crops could be isolated. It should be noted that the following results are restricted to respondents who reported cultivating paddy in the year prior to the survey. Overall, 76 per cent of supported households cultivated paddy, compared to 57 per cent of comparison households.

It is evident that there are significant differences between the intervention and comparison households in the amount of paddy harvested in the year prior to the survey. Three of the four estimation models show a difference of between 16 and 20 bags between the intervention and comparison households who cultivated paddy. However, the model that controls for the influence of outliers (robust regression), estimates the difference to be in the order of eight bags. However, all models concur that there is a statistically significant difference between the intervention and comparison growers on this measure, providing evidence of a positive project effect on overall paddy production.

It is also evident that there are significant differences in the quantity of paddy sold and the revenue gained from its sale. The models estimate that supported households sold on average between 6 and 16 bags more than matched comparison households – a difference that is statistically significant. Similarly there are highly statistically significant differences in terms of the market value of the paddy harvested by supported households. The associated difference in revenue from paddy sales is estimated at between 7,400 and 28,000 rupees. It is important to note that the model that controls for outliers suggests that this difference is not statistically significant. This implies that there are some outliers in the data who exhibit strong performance in relation to amount of paddy harvested and revenue generated from its sale. It is also interesting to compare the amount of paddy harvested with the amount of paddy sold. Almost 80% of the paddy harvested by intervention households was sold, compared to approximately two-thirds in comparison households.

Figure 7 presents the results on paddy production and selling for Ampara and Batticaloa districts. It is evident from these that there are only small differences between the supported households from the two districts in relation to the average amount of paddy harvested in the year prior to the survey. In both districts, supported households harvested significantly more paddy than comparison households. The *magnitude*



of the differences is slightly larger for supported households in Ampara, but the results are more *statistically significant* for intervention households in Batticaloa. An explanation appears to be that the larger difference in Ampara is partly driven by a small number of outliers, i.e. there may be a few households that are harvesting significantly more than the average

supported household. In Batticaloa, the positive differences between the intervention and comparison households appear to be less influenced by outliers, i.e. the differences are more uniform across the supported households. This same conclusion applies to the differences between supported households in Ampara and Batticaloa in relation to both the quantity of paddy sold, and the revenue from its sale.

However, the results in this section concur that there is evidence that the project has successfully increased paddy production and revenue among supported growers in both Ampara and Batticaloa districts.

### ***Production and sales of other crops***

While supporting paddy production was a key thrust of the project, there were also interventions implemented to support the production of other crops, such as training in vegetable growing, inter-cropping, and organic production. As a reminder (See Figure 6 above), the other crops mentioned in the survey are:

- green grains
- maize
- ground nuts
- sweet potato
- manioc
- coconut
- fruits
- mushrooms
- other vegetables.

It is interesting to compare the market value of other crops harvested by supported growers in Ampara district with the results presented in Figure 6. Those results suggest supported households in Ampara district cultivate fewer crops than supported households in Batticaloa, however, the average market value and revenue generated from non-paddy crops is considerably greater in Ampara district. This suggests that greater produce is being harvested among a smaller number of growers in Ampara district. Interestingly, while there are differences in the market value and revenue generated between the supported households in Ampara and Batticaloa districts, there are no significant differences in these measures between the supported and comparison growers in Ampara. This indicates that there is no evidence that the project has yet successfully effected an *increase* in the production of non-paddy crops in this district. In Batticaloa, this is not the case. There are highly statistically significant differences between the intervention and comparison households in the market value of non-paddy crops harvested, and the revenue generated from sales of these. This indicates a positive project effect on the production of non-paddy crops among supported households in Batticaloa district.

## **Outcome 3: Improved household income**



We found in previous sections that households that were supported by this project generally generated greater revenue from sales of agricultural products (including paddy and other crops). This does not by itself imply that there was a corresponding increase in household income: in a context where households generally have multiple livelihoods activities, it is possible that a project that has made agricultural activities more productive could have diverted resources from other livelihoods activities. It is important, therefore, to evaluate the effects of the project household income as a whole.

### ***Self-reported measures of income change***

Various measures were used in the survey to evaluate overall household income. The simplest measure is that respondents were asked to estimate whether their household income had increased, decreased, or remained about the same since 2008. The analysis clearly shows that much larger proportions of the supported households reported experiencing positive income changes than did the comparison households. Overall, 50 per cent of the supported households said they had experienced an increase in their income since 2008, compared to only 21 per cent of the comparison respondents.

The respondents were further asked about their ability to meet household needs. They were specifically presented with the following four descriptions and asked which reflected their own situation most closely over the past 12 months:

- **Doing well:** able to meet household needs by your own efforts, and making some extra for stores, savings and investment.
- **Breaking even:** Able to meet household needs, but with nothing extra to save or invest.
- **Struggling:** Managing to meet household needs, but depleting productive assets and/or sometimes receiving support.
- **Unable to meet household needs by your own efforts:** dependent on support from relatives living outside of your household or the community, government and/or some other organisation – could not survive without this outside support.

Households were subsequently coded with 1 if they reported themselves to be breaking even or doing well and 0 otherwise. The results show that similar to the measure on positive income change, a greater proportion of supported households reported breaking even or doing well than did the comparison households. It is interesting to note that while the proportion of supported households in Ampara district scoring positively on this measure is higher than supported households in Batticaloa district, the difference between the supported and comparison households is significantly greater in Batticaloa.

These simple measures provide an indication of how respondents see their own socio-economic position, and whether they feel that their situation has been changing for the better. However, for a robust assessment of a project impact, it is preferable to use a more objective indicator.

### ***Household consumption and expenditure***

Measuring household income directly is problematic: self-reported measures of total income are generally regarded as unreliable, given the wide variety of endeavours such populations engage in to generate income.<sup>2</sup> We have seen that, even with agricultural production, the measures collected in the survey do not provide a good indicator of net income to the household: for example, we were not able to take into account all the costs of production. Most households reported that they were also engaged in other livelihoods activities; a direct income measure would have to collect detailed information about the contribution of each of these activities to household income.

For these reasons, the survey did not attempt to collect data on total household income directly. However, there is a widely-recognised and strong association between household income and consumption.<sup>3</sup> The effectiveness review therefore followed common practice in micro-level socio-economic analysis, by considering household consumption and expenditure as an indicator of income.

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<sup>2</sup> Morris, Saul; Calogero Carletto; John Hoddinott, and Luc J. M, Christianensen. (1999) *Validity of Rapid Estimates of Household Wealth and Income for Health Surveys in Rural Africa: FCND Discussion Paper No. 72*. Washington: International Food Policy Research Institute.

<sup>3</sup> See Gujarati, Damodar N. (2003) *Basic Econometrics: Fourth Edition*. New York: McGraw Hill.

To that end, respondents were asked to provide detailed information about their recent expenditure on both food and non-food items. Firstly, the respondents were asked what types of food they consumed over the previous seven day period, as well as the particular quantities. The quantities of each food item consumed were then converted into a monetary value. This was done by asking the respondent how much was paid for the food item in question or – if the food item was from the household's own production – how much it would be worth if it was purchased from the local market. The respondents were also asked how much they spent on particular regular non-food items and services from a list such as soap, toothpaste, and transport fares over the past four weeks. Finally, they were asked to estimate the value of other occasional types of expenditure – such as school fees, clothes, medical expenses and home repair – that they had incurred over the last 12 months.

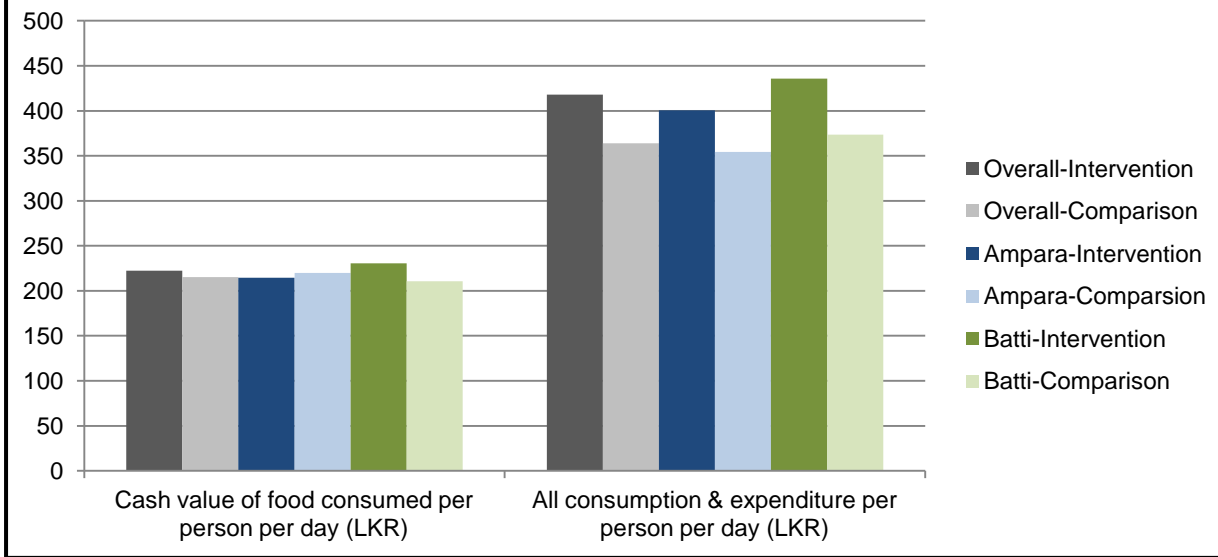
The household expenditure measure was calculated by converting each of the expenditure types into a per-day figure and adding them together. This figure was then divided by a factor representing household size, to generate a per-day, per-person expenditure figure.

From the analysis, it is apparent that household income among supported households is consistently estimated to be higher than among the comparison households: the estimates of this difference range from eight to 10 per cent, or 31 to 54 rupees per capita per day. Interestingly, when analysing the results for the two districts separately, some differences emerge. There is a greater increase in household income among supported households in Batticaloa: the estimates of the difference between intervention and comparison households range from eight to 12 per cent, or 34 to 62 rupees per capita per day. All statistical models concur this difference to be significant, indicating there is evidence that the project has successfully affected household income change among supported households in Batticaloa district. In Ampara district, the difference between the intervention and comparison households is estimated at between six and eight per cent, or 21 to 46 rupees per capita per day. However, not all statistical models estimate this difference to be significant, indicating more marginal evidence of a positive project effect on household income among supported households in Ampara district.

Figure 8 compares the intervention and comparison households in relation to both their average food consumption/expenditure per capita as well as their overall consumption/expenditure per capita. It is interesting to note two things: firstly the amount the average household of both groups consumes/spends on food, accounts for approximately half of their total consumption and expenditure; secondly, the more significant differences between the intervention and comparison households are restricted to non-food consumption and expenditure.



Figure 8: Food consumption and overall consumption & expenditure per capita per day (PSM Kernel)



**Outcome 4: Increased food diversity and security**

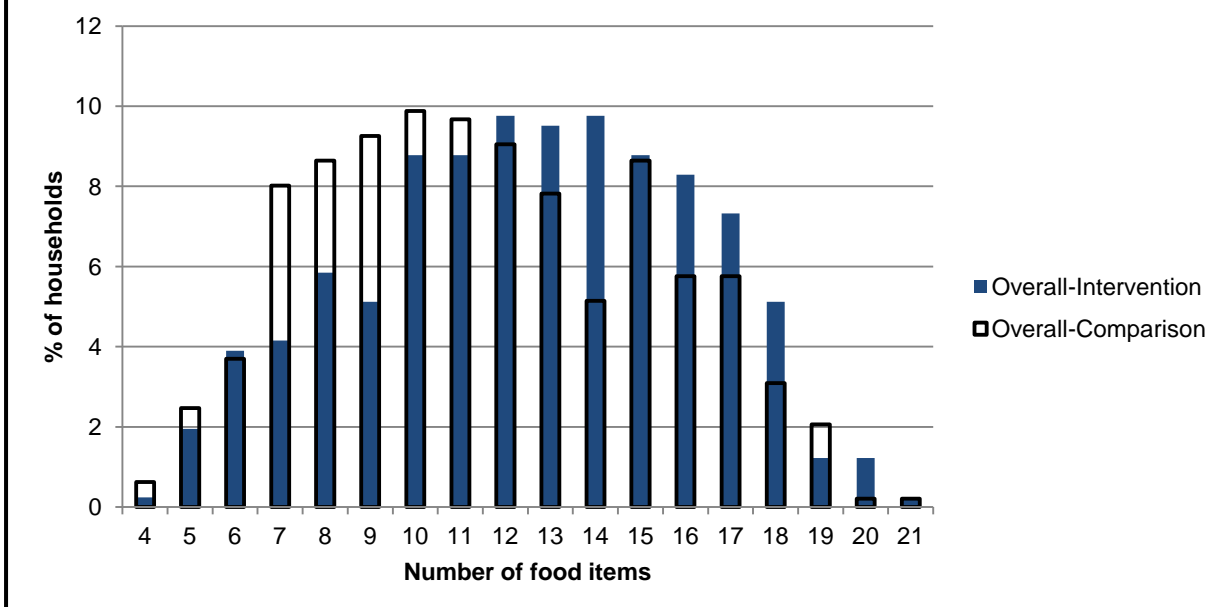
A

**Household food diversity**

The food consumption section of the questionnaire asked respondents not only for their expenditure on food during the seven days prior to the survey, but also the number of days on which each food type was consumed. From this data, it was possible to draw indicators of the diversity of the household’s diet.

Figure 9 shows the histogram of the number different food items (including grains and other carbohydrates, dairy products, meat, fish, fruit and vegetables) which each household reported consuming during the seven days prior to the survey.

Figure 9: Distribution of number of food types consumed



It can be seen that there is extensive variation in the number of food types reported being consumed, and it is also apparent that differences exist between the intervention and comparison households. The analysis confirms that there are statistically significant differences between the intervention and comparison households in terms of the number of food types consumed, however, this is restricted to supported households in Batticaloa district. Here, supported households consume on average almost 1 more food item per week than their comparators, i.e. dietary diversity is significantly greater among the supported households. No significant positive differences are evident between the supported and comparison households in Ampara – in fact the data shows diversity is perhaps lower than the comparison households.

The diversity of fruit and vegetables eaten is very similar among supported households in both districts (with an average of 6.5 types). Once again, the results suggest that supported households in Batticaloa district have a more diverse diet than the comparison households, while supported households in Ampara district have a less diverse diet than the corresponding comparison households.

### ***Food security***

In addition to increasing the dietary diversity of supported households, a key objective of the project was to increase food security among supported households. The questionnaire sought to capture information on food security by initially asking whether during the year prior to the survey (March 2012 to February 2013) the household did not have enough rice to eat. If the households reported shortage during the year they were then asked to record which months such shortage occurred. The analysis shows that 80 per cent of supported households in Ampara district reported no shortage of rice during the 12 months prior to the survey. This is considerably higher than in Batticaloa district, where just over half of supported households reported no shortage. There are also differences between supported households and comparison households, although these are only statistically significant in Ampara district.

In terms of the number of months a household reported a shortage of rice, again there are differences among supported households in Ampara (an average of 0.4 months) and Batticaloa (an average of 0.9 months). In Ampara, there is some evidence of a difference between supported and comparison households, with intervention households experiencing on average 0.2 to 0.3 fewer months of rice shortage than their comparators.

In summary, there is therefore some evidence that the project has successfully affected the availability of rice, thus contributing to an associated increase of food security among supported households in Ampara district. While there is no evidence of an increase in the security of rice availability in Batticaloa, it should be recalled from prior analysis that supported households in Batticaloa have a more diverse food and crop base than those in Ampara, and therefore may be less reliant on rice for food security. This may also explain why there are considerable differences in these measures between the districts

## **Outcome 5: Increased asset wealth**

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One weakness with using current household expenditure as a measure of wellbeing is that it is likely to be highly dependent on recent income levels, and may not strongly reflect any long-term changes in wellbeing. An alternative measure that may more accurately assess long-term improvements in household wellbeing is to examine indicators of a household's material wealth. For that reason, respondents were asked about their ownership of various types of household goods and productive assets, as well as about the condition of their housing. These data were used to create indices of each household's wealth, relative to the other households surveyed in the same region, both as of the baseline in 2008 and as of the date of the survey.

The wealth indices were derived by taking dividing each indicator (that is, the number of each asset owned by the household, or the condition of the housing characteristic) into two or three quantiles. The correlation of each indicator with the others in the dataset was examined using Cronbach's alpha, a coefficient of reliability.<sup>4</sup> All those indicators with negative correlation were removed from the wealth index.

A total of 42 assets and other wealth indicators were used to construct the 2013 household wealth index, with their inter-item correlations. The overall alpha is 0.83, showing that the various items used to construct the wealth index are highly correlated. A further index was created of the change in wealth indicators between 2008 and 2012, with an alpha of 0.79.

The wealth indices were created through applying principle component analysis (PCA) to the selected indicators. PCA is a data reduction technique that narrows in on the variation in household asset ownership, which is assumed to represent wealth status: the more an asset type is correlated with this variation, the more weight it is given. This analysis was performed separately for each of the two regions, given that the patterns of asset ownership are likely to differ between them.

The results show that supported households in both Ampara and Batticaloa have higher values of the wealth index in 2013 than the corresponding comparison households. These differences are statistically significant across three of the four models for Ampara and all four models in Batticaloa, indicating that the evidence is more robust for a difference in wealth among supported households in Batticaloa. This conclusion is supported by the accompanying analysis that considers the changes in wealth status between 2008 (baseline) and 2013. This shows very strong evidence of a significant increase in household wealth among supported households in Batticaloa district. Unfortunately, none of the models estimate the difference in household wealth change between intervention and comparison households in Ampara district to be statistically significant.

### Outcome 6: Increased awareness of how to access legal services



The project was intended not simply to improve the material wellbeing of participants, but also to have a positive impact on wider issues, such as in reducing gender-based violence and strengthening property rights. While the questionnaire did not cover these issues in detail, it did capture basic information on a household's awareness of:

- how to access relevant services for victims of gender-based violence (including protection)
- how to access other legal/referral services (e.g. related land rights, property rights, employment law, consumer law, etc.).

The analysis shows that the 95 per cent of supported households in Ampara, and 77 per cent of supported households in Batticaloa are aware of how to access relevant services related to gender-based violence. In comparing these results with the comparison households, we see that six to nine per cent more supported households in Ampara, and 14 to 17 per cent more supported households in Batticaloa are aware of how to access these services. These differences are highly statistically significant, particularly in Batticaloa, although this may be because such a high proportion of both intervention and comparison households were aware of how to access these services in Ampara district. Therefore there may not have been the

<sup>4</sup> When items are used in a scale or index, they should all measure the same underlying latent construct (e.g. household wealth status). The items, then, must be significantly correlated with one another. Cronbach's alpha is a measure of this inter-item correlation. The more the variables are correlated, the greater is the sum of the common variation they share. If all items are perfectly correlated, alpha would be 1, and 0 if they all were independent from one another. For comparing groups, an alpha of 0.7 or 0.8 is considered satisfactory. See: Bland, M. J. & Altman, D. G. (1997) 'Statistics notes: Cronbach's alpha,' *BMJ*, 314: 572.

scope for the project to impact on this to such an extent. Regardless of this, these results do indicate there is evidence of a positive project effect in increasing awareness of how to access relevant services for victims of gender-based violence.

The results are remarkably similar in terms of households reporting awareness of how to access legal/referral services related to land and property rights, and employment/consumer law. As for access to services related to gender-based violence, a greater proportion of households in Ampara – both intervention and comparison – reported awareness of how to access legal services than those in Batticaloa. In both districts there are also significant differences between the intervention and comparison households reporting awareness, although the magnitude of difference is greater in Batticaloa. As above, there is therefore some evidence of a positive project effect in increasing awareness of how to access relevant legal services.

## Outcome 7: Improved household hygiene behaviour

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The final aspect considered in this effectiveness review is the effect of training on public health practice among supported households.

### ***Water treatment***

Firstly, respondents were asked whether they treated water in any way to make it safer to drink. The results show that almost all supported households in Batticaloa (97 per cent) reported treating their water to make it safer to drink – a statistically significant increase of between four and six per cent compared to households in the comparison group. Overall, 82 per cent of supported households in Ampara district reported treating their water; however the difference with the supported households in Ampara is not statistically significant.

Additionally, respondents were asked what they usually did to make the water safer to drink. The options included:

- Boil the water
- Add bleach or chlorine
- Strain the water through a cloth
- Use a water filter
- Use solar disinfection
- Let the water stand and settle
- Other.

The second part of the analysis considers the proportion of households who implemented more 'rigorous' methods of water treatment, i.e. those who either boiled the water, added bleach or chlorine, used a water filter or used solar disinfection. It is evident from the analysis that 94 per cent of supported households in Batticaloa reported treating their drinking water using these methods – again, a statistically significant increase of between six and eight per cent compared to households in the comparison group. Just over 80 per cent of supported households in Ampara scored positively for this measure. As for the first measure, no significant differences were detected between the supported and comparison households in Ampara district.

Taken together, these results provide evidence that the project has successfully increased the practice of hygienic water treatment among supported households in Batticaloa district, while there is no evidence from this data of a change in practice in Ampara district.

### ***Hand-washing practice***

The final indicator considered in this review relates to hand-washing practice. Respondents were asked when they usually washed their hands with soap, and were given six options:

- Before meal times
- After meal times
- Before bed
- Before cooking
- After using the toilet
- Other.

The analysis considers the number of times respondents recorded washing their hands with soap, as a proxy for good hand-washing practices. Overall, respondents from supported households in Ampara recorded washing their hands 3.8 times, compared to 3.3 times for respondents from comparison households. Once observable differences between the intervention and comparison households are controlled for these differences are not statistically significant. However, there are statistically significant differences between respondents from supported and comparison households in Batticaloa district. Here, respondents from supported households reported washing their hands 3.9 times – an increase of between 0.6 and 0.7 compared to respondents from comparison households.

As for water-treatment practice, this indicates some evidence of a positive project effect on hygienic hand-washing practice among supported households in Batticaloa district only.

## **Conclusions**

This effectiveness review has found clear evidence that households supported by the 'Improving Socio-Economic Conditions of Paddy Farmers in East Sri Lanka' project have, on average, experienced positive changes compared to the comparison group. Greater proportions of the supported households have adopted the use of improved agricultural techniques than the comparison group, including irrigation in Ampara district. Also, supported households are more likely to be implementing other productivity-related innovations, such as seed-paddy production and processing, selling produce to companies or agricultural cooperatives and growing vegetables (Ampara only), and using crop insurance (Batticaloa only). Interestingly there is also evidence that more land has been brought into productive use by supported households in both Ampara and Batticaloa.

There is evidence too that production and sales of paddy have increased among supported households. At a district level, while the magnitude of increase is greater for supported households in Ampara district, the statistical significance of the difference is greater for households in Batticaloa. This indicates that there may be a smaller number of households who are harvesting and selling significantly more than the average supported household, whereas in Batticaloa the differences appear to be more uniform across the supported households. It is also interesting to note that almost 80 per cent of rice cultivated among supported households is sold, compared to 57 per cent among comparison households. There is also evidence of a positive project effect on the production of non-paddy crops (e.g. maize, groundnuts, fruits and vegetables) among supported households in Batticaloa.

This increase in agricultural production and sales appears to have led to a significant increase in overall household income. The best estimates of this increase range from 8 to 10 per cent, or 31 to 54 rupees per capita per day. Interestingly, when analysing the results for the two districts separately, there is evidence of a greater increase in household income among supported households in Batticaloa: the estimates of the difference between intervention and comparison households range from eight to 12 per cent, or 34 to 62 rupees per capita per day. In Ampara district, the evidence is more marginal, with the difference between the intervention

and comparison households estimated at between six and eight per cent, or 21 to 46 rupees per capita per day. Other related measures, such as the analysis of changes in household asset ownership, make it apparent that there is more robust evidence that the project has successfully affected household income and wealth among supported households in Batticaloa district.

In terms of food security, there is evidence that the project has successfully affected the availability of rice in Ampara district. While there is no evidence of an increase in the security of rice availability in Batticaloa, there is evidence that supported households have a more diverse food and crop base than those in Ampara. This latter point may also explain the fact that supported households in Batticaloa have greater dietary diversity.

Finally, there is also evidence of a positive project effect on associated project objectives. For example, supported households have a greater awareness of how to access services for victims of gender-based violence, as well as legal services related to land and property rights. Additionally, there is evidence among supported households in Batticaloa of improvements in hygiene practice related to hand-washing and treatment of drinking water.

## **Programme learning considerations**

While the majority of the findings of the effectiveness review are positive, there are additional lessons emerging from the results that can be applied to other projects of this type in Sri Lanka and elsewhere. The Sri Lanka country team and the project team in particular are encouraged to consider the following:

- ***Investigate the reasons for the differences in impact on several measures between supported households in Ampara and Batticaloa districts.***

The quantitative methods used for the effectiveness review are valuable in assessing whether the various project activities were successful in bringing about positive changes to the targeted households. However, there are limitations on how much these methods can reveal about how and why these outcomes arose.

The results presented in this report highlight some key differences in impact between the supported households in Ampara and Batticaloa districts. For example, there is evidence that the project has more successfully affected changes in household income and wealth among supported households in Batticaloa. Is this connected to the more diverse crop and food base among households in this district? Is it solely down to context, or are there differences in the way the livelihood-related interventions are being implemented in the two districts?

We recommend that Oxfam and partners conduct a follow-up assessment to probe the reasons behind the different district-level results in certain components of the project. In-depth interviews with a range of participants in the different project components could provide understanding on how engaging in specific elements of the project interacts with households' decisions on how to allocate their time and resources between other livelihoods activities, and on what limitations households face in generating greater gains.

- ***Follow up with supported rice-producers in Ampara to identify where greater successes in increasing rice production have been realised.***

As mentioned above, there is evidence of a greater magnitude of increase in terms of rice production and revenue generated among supported households in Ampara district. However, this appears to be concentrated among a smaller number of large producers. It is recommended that Oxfam and partners follow up on these specific

cases to explore the factors associated with this greater production, in order to see whether there are any opportunities to apply lessons learned to other supported households within the project.

- ***Consider exploring in more detail how the project has affected supported households in relation to gender-based violence and legal rights (e.g. property and land rights).***

An interesting finding from the review was evidence of an increase in supported households' awareness of how to access services for victims of gender-based violence, as well as other legal services related to land and property rights, and employment/consumer law. Unfortunately there was not scope for this review to consider these issues in more detail, but we would recommend further follow-up to see whether these increases in awareness have led to more outcome-level change, e.g. reduction in cases of gender-based violence, or an increase in households with access to their land deeds etc.

We would strongly recommend using the final external evaluation to follow up on both the issues highlighted above, and the findings from this review more generally, to probe in more detail the factors and explanations for these reported changes.