Community-Led Disaster Risk Reduction in Mongu, Zambia
Project Effectiveness Review

Summary Report

Oxfam GB
Adaptation and Risk Reduction Outcome Indicator

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Photo: Effects of the seasonal flooding of the Zambezi River in Liyoyelo village, Mongu district. Oxfam GB.

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. Zambia's 'Community-Led Disaster Risk Reduction' project was randomly selected for an Effectiveness Review under the adaptation and risk reduction thematic area. The project aims to increase resilience to climatic shocks among target groups in Mongu district of western Zambia, through: a) strengthening the capacity of target communities to manage and respond to floods and droughts; and ii) encouraging livelihood diversification and asset growth. The community-level activities undertaken to achieve the first objective included the development of early-warning systems, based on local knowledge and linked to wider support systems (e.g. weather stations). In order to achieve the second objective, a range of activities, including provision of fishing nets, canal clearing, embankment building, establishment of banana plantations and use of conservation agriculture were implemented. These project activities were undertaken between 2009 and 2012 in six communities located in the Zambezi floodplain by a local partner organisation – People's Participation Service (PPS).

To assess the effectiveness of this project, a quasi-experimental impact evaluation was implemented. This involved carrying out surveys with households in the six communities supported by the project, as well as with households in six nearby comparison communities. In all, surveys were carried out with 491 households. At the analysis stage, the statistical tools of propensity-score matching and multivariable regression were used to control for demographic and baseline differences between the intervention and comparison groups.

The effectiveness of the project in effecting 31 'resilience characteristics' was assessed through this process. These characteristics fall under five interrelated dimensions: livelihood viability; innovation potential; access to contingency resources and support; integrity of the natural and built environment; and social response capability. Composite indices were developed to aggregate the data associated with the 31 characteristics, following the Alkire-Foster method used by the Oxford Poverty and Human Development Initiative (OPHI) to measure multi-dimensional poverty. One of these indices, in particular, referred to as the Alkire-Foster resilience index informs Oxfam GB's global outcome indicator for its adaptation and risk reduction thematic area.

Following analysis of the data, there is evidence that the project positively affected several characteristics assumed important for promoting resilience among the intervention population. In particular, even after controlling for measured differences between the intervention and comparison households, the former performed between eight and 13 percentage points, and four to six points, better than the latter on Oxfam GB's global Adaptation and Risk Reduction ARR indicator and the Alkire-Foster resilience index, respectively. Such performance in relation to the global indicator shows that in total, 64 per cent of surveyed intervention households demonstrate greater ability to reduce risk and adapt to emerging trends and uncertainty (as measured by the ARR resilience index).

While this Effectiveness Review generated some positive results, it also identified opportunities for reflection and learning. Oxfam in general, and the Zambia country team and partners in particular, are encouraged to consider the following:

- Undertake further research to evaluate the effects of advocacy efforts connected to this project.
- Explore how to involve community members more widely in community-level drought preparedness activities, and to ensure that training and early-warning information is fully disseminated.
- Continue monitoring changes in behaviour and experiences of households in the project communities to learn whether the project activities will eventually result in higher-level changes in risk-reduction behaviour.

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. This framework requires that modest samples of mature projects (e.g. those closing during a given financial year) associated with each thematic indicator area are randomly selected each year and rigorously evaluated. One key focus is on the extent to which they have promoted change in relation to relevant OGB global outcome indicators.

One of the projects randomly selected for the Effectiveness Review under the adaptation and risk reduction thematic area in 2012/13 is Zambia's 'Community-Led Disaster Risk Reduction Project'. The Effectiveness Review, which took place in Mongu district in January and February 2013, intended to evaluate the success of the project in promoting resilience to climatic shocks among supported households. The focus of the review was on the six communities in the Zambezi floodplain supported by the project through to its completion in March 2012. These communities experience perennial flooding, and such events have resulted in recurrent crop failure and property destruction that has undermined household food security, and perpetuated a cycle of asset depletion.

Figure 1: Location of project implementation

In response to these issues, the overall objectives of the project, implemented by a local

partner organisation – People's Participation Service (PPS), were:

- To strengthen capacity of target communities, as well as Oxfam staff, local and district leaders to manage and respond to floods and droughts in Mongu district of western Zambia.
- To increase household and community resilience to disasters through poverty reduction/economic justice, power in markets, awareness of response options, livelihood diversification and asset creation.
- To improve government capacity to lead and manage comprehensive and effective disaster risk reduction and emergency response from local to national levels.

The community-level activities undertaken to achieve the first objective included the development of early-warning systems, based on local knowledge and linked to wider support systems (e.g. weather stations). In order to achieve the second objective, a range of activities including provision of fishing nets, canal clearing, embankment building, establishment of banana plantations and use of conservation agriculture were implemented.

The third objective of the project was not limited to the project communities in Mongu district, and thus it is not formally covered by the results of this Effectiveness Review.

Evaluation approach

The 'Community-Led Disaster Risk Reduction Project' attempted to strengthen the resilience of households living in six communities in the Zambezi floodplain in Mongu district (see Figure 1).

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 others 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 Mongu district, where the project was both implemented and not implemented were mapped out. A total of 491 households were interviewed, including 197 from the six communities that had participated in the project, and a further 294 from six 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 strengthen the capacity of communities and households to manage the risks associated with climatic shocks, such as flooding, drought, water scarcity and crop failure.

Figure 2: Project theory of change (simplified)
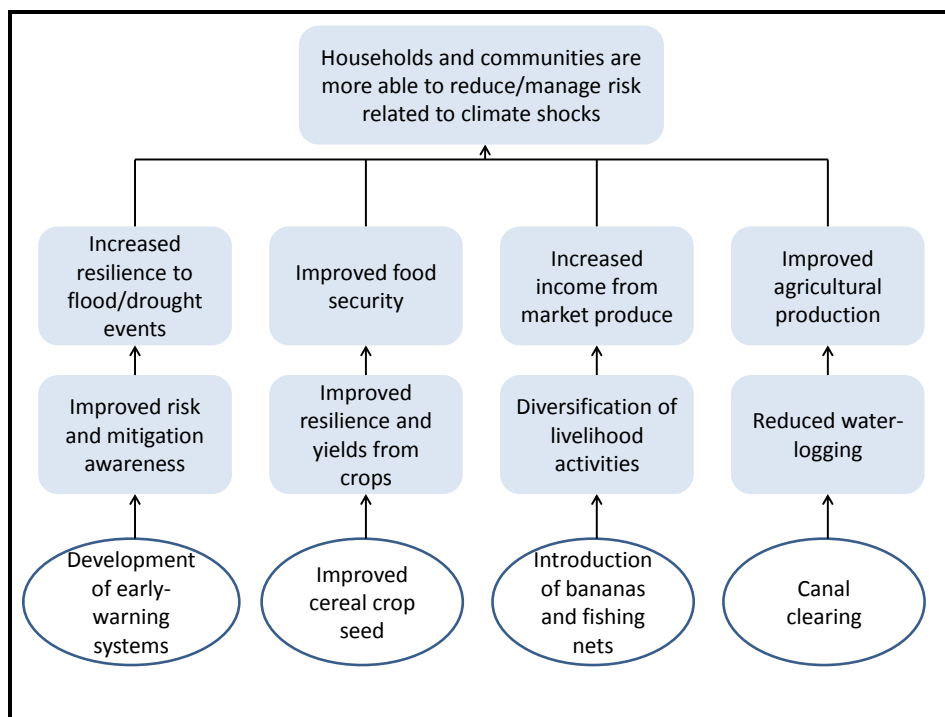
The development of early-warning systems contributes to this through increasing the awareness of community members to flooding and drought hazards, and providing a forum to discuss mitigation measures that can be applied at a community level. Specific activities included:

- Community sensitisation on early-warning information through school activities, radio messages and community meetings.
- Strengthening community relationships with district-level early-warning institutions (e.g. weather monitoring departments).
- Review of community preparedness plans, including integration of traditional early-warning signs.

The project is also providing high yielding variety seeds of major cereal crops suitable to the local climatic conditions, with the intention of increasing crop yield, especially when and where rainfall is erratic. Introduction of these seeds was expected to improve food security of the targeted families, and therefore their resilience to drought events.

The introduction of banana plantations and fishing nets to the project communities was intended to encourage a more diversified livelihood base for farmers, who have traditionally relied on subsistence crops. As well as reducing the risk of food insecurity in the event of cereal-crop failure, it was envisaged that that there would also be the opportunity for increased income gained from the sale of these higher-value food items.
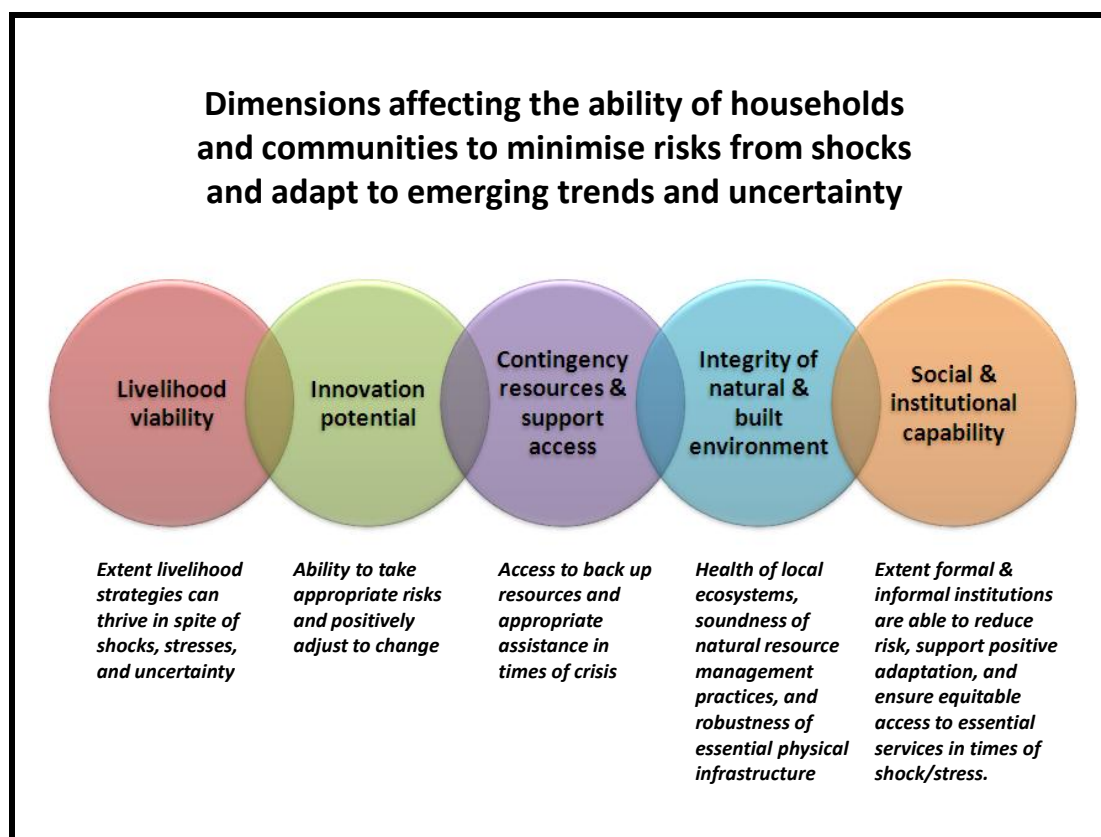
These activities were complemented by a number of canal clearing interventions. One of the key issues affecting agricultural production in the flood-plain project villages is water logging. An Oxfam assessment prior to project commencement found that the effective utilisation of

the wetlands for crop production was poor due to waterlogging of most of the productive land. This was a result of clogged drainage canals, and therefore the project included canal clearing in order to improve drainage and irrigation.

Measuring resilience

Within Oxfam GB, efforts are being undertaken to develop an approach to measuring the resilience of households to shocks and stress and their ability to adapt to change. This approach involves capturing data on various household and community characteristics falling under the five interrelated dimensions presented below.

Figure 3: Oxfam GB's conceptual framework for understanding and measuring resilience

Dimensions affecting the ability of households and communities to minimise risks from shocks and adapt to emerging trends and uncertainty

Livelihood viability	Innovation potential	Contingency resources & support access	Integrity of natural & built environment	Social & institutional capability
Extent livelihood strategies can thrive in spite of shocks, stresses, and uncertainty	*Ability to take appropriate risks and positively adjust to change*	*Access to back up resources and appropriate assistance in times of crisis*	*Health of local ecosystems, soundness of natural resource management practices, and robustness of essential physical infrastructure*	*Extent formal & informal institutions are able to reduce risk, support positive adaptation, and ensure equitable access to essential services in times of shock/stress.*

First, if we think about what a household would need in order to cope with current and future shocks, stresses and uncertainly, a viable livelihood is likely to be one of them. If a shock happens, a household dependent on just one precarious livelihood activity is likely to be more negatively affected than another that has one or more less sensitive alternatives to fall back on, *all other things being equal*. In addition, households that are on the margins of survival are likely to be less resilient than their wealthier counterparts. Where longer-term climatic trend prediction information exists, it is also important to assess how viable current livelihood strategies would be given the range of likely future climatic scenarios.

Innovation potential is different and hence separate. It is focused on a household's ability to positively adjust to change, whether anticipated or not. We can hypothesise that such potential is dependent on factors such as the knowledge and attitudes of relevant household members themselves, their ability to take risks, and their access to weather prediction, market information, and relevant technology and resources.

Moreover, there are likely to be times when even households with the most 'resilient' and adaptive livelihood strategies will find it tough to get by. Access to contingency resources and external support – e.g. savings, food and seed reserves, social protection, kin and non-kin support networks, emergency services, etc. – are, therefore, likely to be critical in supporting households in coping with shocks and positively adjusting to change.

It is further recognised that healthy ecosystems are better able to cope/adjust to climatic shocks/change than those that are more degraded. We may reasonably assume – again, with all other things being equal – that households whose livelihoods are dependent on healthier ecosystems will be in a better position to adjust to climatic shocks/change than those that are not. The presence of appropriate infrastructure (e.g. pit latrines and roads) that is resilient to shocks and stresses (e.g. flooding) is equally important. If critical infrastructure no longer functions or collapses in times shocks and stress, the livelihoods and/or health of community members can be negatively affected.

In most situations it is necessary to look beyond the household level when examining resilience and adaptive capacity. Indeed, it is reasonable to assume that households are better able to successfully adjust to climatic shocks or change when they are part of larger coordinated efforts at the community level and beyond. The social and institutional capability dimension, in particular, is concerned with the effectiveness of informal and formal institutions in reducing risk, supporting positive adaptation, and ensuring equitable access to essential services in times of shock/stress. In the absence of this capability, we can assume that community-level duty-bearers will be less effective in fulfilling their responsibilities in supporting community members to reduce risk and/or successfully adapt.

Specific characteristics believed to influence both resilience and adaptation fall under each of the five dimensions. However, no 'one size' fits all; that is, many of the characteristics appropriate for a particular population may not be so for another. As such, each particular suite of characteristics needs to be appropriately specified given the nature of the population in question and the hazards and change processes to which it is likely to be subjected.

Measurement using the Alkire-Foster method

To make the above framework operational as a measurement tool, the Alkire-Foster method used by the Oxford Policy and Human Development Initiative (OPHI) and other organisations to measure complex constructs, such as poverty and women's empowerment, was deployed.

Under the Alkire-Foster method, binary cut-offs are specified for each characteristic of resilience. For example, a household may be defined as having a diversified livelihood if it is dependent on at least two livelihood activities, where at least 50 per cent of these activities can be considered significantly drought tolerant. Each of the dimensions presented in Figure 3 was then weighted equally in order to calculate the overall resilience measures.

An initial composite index (called the *base resilience index*) is constructed by adding the weighted characteristics together for each household. This index represents the percentage of the weighted characteristics each household is deprived in. Hence, a household that is deprived in all the characteristic indicators will score zero, while a household that is not deprived in any of them will score 100 per cent.
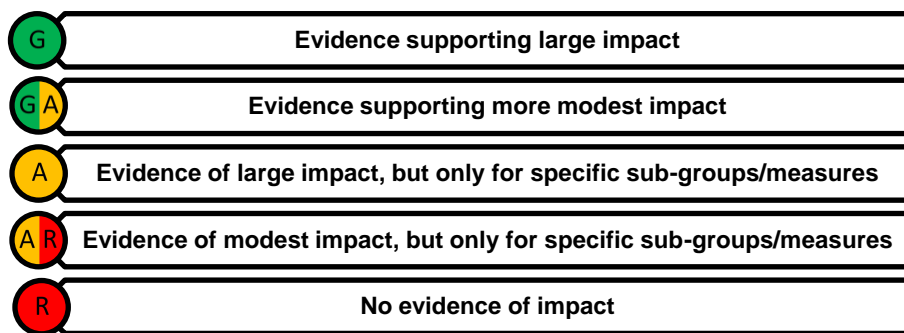
The next step involves specifying an overall cut-off for the base resilience index. In this Effectiveness Review, the overall cut-off was set at two-thirds. Following the Alkire-Foster method, those above this cut-off are considered to be resilient and are given the maximum possible score on the index. Those below the cut-off are given an index score equal to the proportion of characteristics in which they score positively.

Resilience characteristics used in the Effectiveness Review

There is no one generic set of 'resilience' characteristics that are applicable to all contexts. For the purposes of this Effectiveness Review, the review team consulted with programme staff to draw up a list of characteristics relevant to the context in Mongu district. The full list of the 31 characteristics considered is shown in the summary results table.

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 full report is also available that provides a more detailed and technical description of the evaluation design, process and results. Table 1 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.

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

Table 1: Summary results

Dimension	Outcome/indicator	Cut-off – *a household scores positively if:*	% supported households above cut off (unadjusted)	Evidence of impact	Large/ modest impact	Directly targeted by project	Linked to project logic
Overall resilience (G)	**Overall resilience index – global outcome indicator**	**Household has an AF resilience score above the median score for comparator households**	**64%**	**Yes**	**M**	**Yes**	**Yes**
Livelihood viability (20% weighting) (G A)	Household wealth status	It owns >=3 small assets Or >=2 big assets Or 2 small assets + 1 big asset.	60%	No		No	Yes
	Household food security	It reports having had to cut the size of meals, eat fewer meals, or reduce food consumed by adults in household <3 times in past week and reports no incidence of having to borrow food, going to sleep hungry, or going through a whole day with no food.	37%	No		No	Yes
	Household dietary diversity	It consumed in the past 7 days a carbohydrate source >=7 times; a protein source >=3 times; and any vegetable source >=3 times.	54%	Yes	M	No	Yes
	Livelihood diversification	It engages in >=2 livelihood activities with >= 50% dependency on activities assumed to be significantly drought tolerant.	41%	No		Yes	Yes
	Crop portfolio	It cultivated >=3 crop types, including at least one drought-resistant crop.	62%	No		Yes	Yes
	Availability and use of early-warning information	It received early-warning information prior to the flooding in 2012.	82%	Yes	M	Yes	Yes
	Flood preparedness practice	It took preparatory actions to protect their household or their assets from flooding in 2012.	47%	No		Yes	Yes
Innovation potential (20% weighting) (G)	Attitudes towards new livelihood practices	Respondent either does not agree at all or agrees only to a small extent with 2 out of the 3 negatively phrased statements (Likert scale).	75%	No		Yes	Yes
	Innovation practice	Respondent reports having tried out or experimented with at least one new activity over the past 2 years.	81%	Yes	L	Yes	Yes
	Access to credit	Respondent reports that household took out loan in last 2 years Or could borrow at least 500 ZMK in the event it was needed from a money lender, non-local family members, savings group, or bank/credit institution.	53%	No		No	No
	Access to state innovative support	Respondent reports having accessed state extension support in new techniques in the last two years and reports at least finding the support moderately helpful.	45%	Yes	L	Yes	Yes
	Market access	Respondent reports having had no severe problems in accessing markets or market information.	33%	No		No	Yes

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Dimension	Outcome/indicator	Cut-off – *a household scores positively if:*	% supported households above cut off (unadjusted)	Evidence of impact	Large/ modest impact	Directly targeted by project	Linked to project logic
Access to contingency resources and support (20% weighting) **R**	Group participation	Respondent reports being an active participant in at least 2 groups with medium involvement in decision making in at least one.	54%	No		No	No
	Social connectivity	Respondent agrees at least to a medium extent with 3 out of the 5 positively phrased statements.	40%	No		No	No
	Perceptions of local govt emergency support	Respondent agrees at least to a medium extent with 1 out of the 2 positively phrased statements.	43%	No		No	Yes
	Savings	Respondent states that there are enough savings to enable them to survive for at least 7 days in the event of a drought.	21%	No		No	Yes
	Remittances or formal earnings	It reports having receipt of transfer money from outside community and/or someone in the home has a formal job.	34%	No		No	No
	Ownership of convertible livestock	It reports owning at least 5 goats or at least 5 poultry.	36%	No		No	Yes
Integrity of the natural and built environment (20% weighting) **R**	Fertility of local soils	It reports no negative change in fertility of farm plot.	24%	No		No	No
	Extent of soil erosion	It does not report experiencing severe erosion.	61%	No		No	No
	Access to irrigation for farming	It reports having access to irrigation facilities.	62%	No		No	Yes
	Access to water for drinking and livestock	It reports no difficulties in accessing water for the household or its animals during the 2012 dry season.	53%	Yes	M	No	Yes
	Extent farming activities affected by flooding	It reports having experienced only a small portion of its crops being lost during the 2012 flooding.	50%	No		Yes	Yes
	Use of improved sanitation	It reports using improved sanitation facilities.	40%	Yes	L	No	No
Social and institutional capability (20% weighting) **G**	Awareness of drought preparedness plan	It is at least partly aware of the contents of the plan.	54%	Yes	L	Yes	Yes
	Participation in drought prep. meetings	It has participated at least one meeting in past 12 months.	69%	Yes	L	Yes	Yes
	Receipt of drought prep. Information	It had received such information in past 12 months.	50%	Yes	L	Yes	Yes
	Awareness of community-level drought risk reduction initiatives	It is aware of at least 2 community-level initiatives taken place in past 3 years.	79%	No		Yes	Yes
	Water resource dispute experience	It does not report being involved in any disputes in past 2 years.	85%	No		No	Yes
	Awareness that local leaders are undertaking action	It is at least partly aware that community leaders/institutions are doing something on the adaptation front.	53%	Yes	L	No	Yes
	Level of confidence in effectiveness of local leaders/institutions	Respondent agrees at least to a medium extent with 1 out of the 2 positively phrased statements.	54%	No		No	Yes

Impact assessment findings

Overall results   G

As described above, the indices of resilience are defined from 31 different characteristics, all of which were assessed by means of a survey at household level. The proportion of characteristics in which each household scored positively was calculated: this measure is known as the *base resilience index*.

Interviewed households scored positively, on average, on 52 per cent of characteristics, and the comparison households in 46 per cent of characteristics. The various statistical models which are used to control for baseline and demographic differences all concur that this represents a significant positive difference between the supported and comparison households.

Under the Alkire-Foster method described above, a household was defined as 'resilient' overall if it scored positively on more than two-thirds of the characteristics. Overall, 22 per cent of the supported households reached this benchmark, compared to 12 per cent of comparison households. Again, this represents a highly significant positive difference.

The Oxfam GB global indicator is defined to be positive for any household which has a resilience index score greater than the median of the comparison group. In this way, the global indicator reflects whether a household scores positively in more characteristics than a 'typical' household in the comparison group. On this measure, 64 per cent of supported households scored positively, compared to 51 per cent of comparison households – a statistically significant difference. In essence, this shows that **64 per cent of surveyed intervention households demonstrate greater ability to reduce risk and adapt to emerging trends and uncertainty** (as measured by this index).

While the overall resilience index provides an overview, it is essential to know the situation of the population in relation to each of the characteristics, and which characteristics are driving the difference between the intervention and comparison households. The following sections, therefore, consider the various characteristics and the contributions that each make towards households' resilience.

Dimension 1: Livelihood viability   G A

The first dimension included in the resilience index is that of livelihood viability: To what extent is there evidence that households in the intervention villages possess livelihoods that are more resilient to shocks than the comparison households?

On average, the intervention households scored positively on 55 per cent of the seven indicators, while the comparison households scored positively on 47 per cent. However, this difference is statistically significant in only one of the five statistical procedures with at least a 95 per cent level of confidence. There is therefore only marginal evidence that the project has enhanced the livelihoods of the intervention population.

Figure 4 presents the percentage of households scoring positively on each of the indicators in the livelihood viability dimension. The indicators have been ranked for the intervention population from most deprived to least deprived. As is evident, both the general intervention and comparison populations are most deprived in relation to food security.

Figure 4: Percentage of HHs scoring positively on characteristics of the livelihood viability dimension
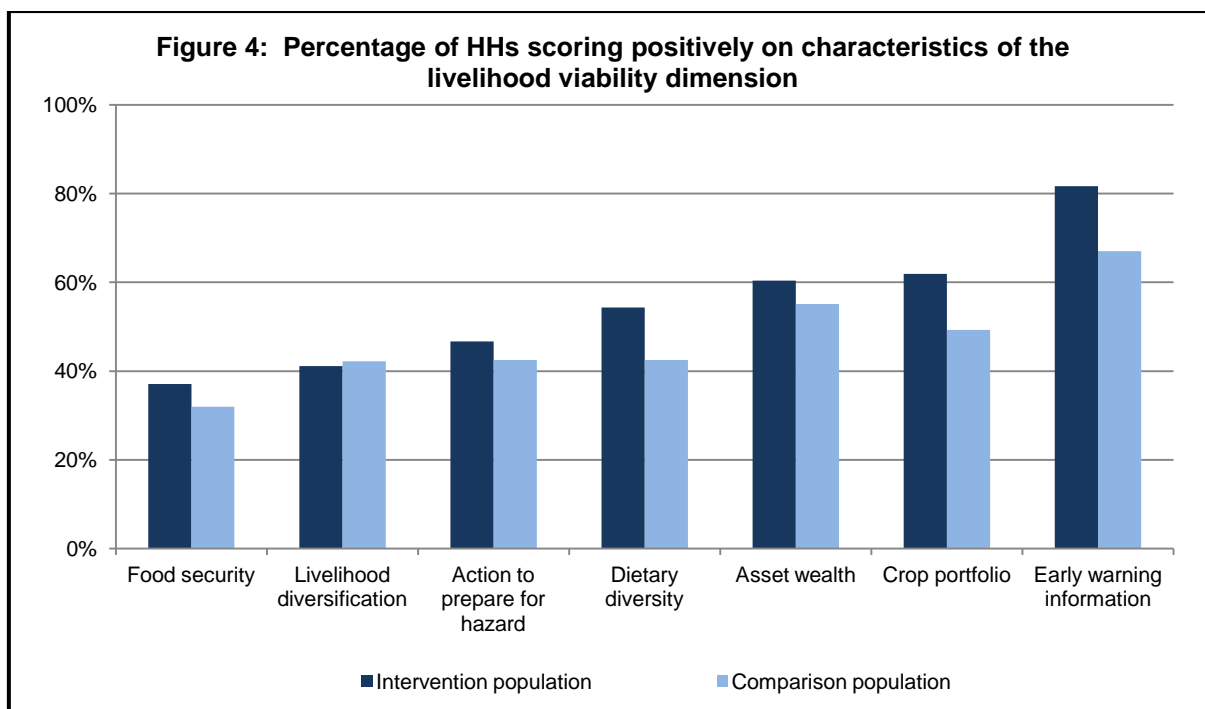
Differences between the intervention and comparison households are also apparent from the graph. The intervention households perform marginally better in relation to the comparison households for several of the characteristics. However, the graph was constructed with the data before it was analysed with PSM and multivariable regression.

Turning our attention to the characteristic with the lowest proportion of households scoring positively – i.e. food security, we see that there are no significant differences between the intervention and comparison households. As a reminder, the cut-offs for determining whether a household receives a positive score on a particular characteristic are detailed in Table 1. For this particular characteristic, the cut-off is whether the household reported having had to cut the size of meals, eat fewer meals, or reduce food consumed by adults in household fewer than three times in the past week and reports no incidence of having to borrow food, going to sleep hungry, or going through a whole day with no food. As is evident, 37 per cent of intervention households scored positively in this regard, compared to 32 per cent of comparison households. As this difference is not significant, we cannot claim that the project has successfully affected this outcome.

In terms of the other indicators in this domain, it is clear that of the seven indicators, only two exhibited statistically significant differences between the intervention and comparison households. The first of these relates to dietary diversity. Overall, 54 per cent of project households scored positively on the dietary diversity characteristic, compared to 43 per cent of comparison households. This difference is statistically significant; indicating that there is evidence that the project has increased the diversity of food types consumed by supported households.

The second characteristic in which there is a significant difference relates to the availability of early-warning information. Households were asked to think back to the flooding event of 2012, and recall whether they received early-warning information that enabled them to plan and protect their livelihoods. Overall, 82 per cent of project households reported receiving such information, compared to 67 per cent of comparison households – a difference that is highly statistically significant. This indicates that there is strong evidence that the project has successfully affected the household's access to early-warning information. Respondents were also asked to record the source of such information; for example, 32 per cent of project households reported receiving the information from community leaders, 50 per cent from the

Community Disaster Risk Management Committee, 28 per cent from government officers, and 69 per cent from the radio.

It is interesting to note that while there is evidence of a strong project effect on access to early-warning information, there is no evidence that the project affected whether households took any specific precautionary actions in preparation for the flooding of 2012. Less than half (47 per cent) of project households reported taking any such action, compared to 43 per cent of comparison households – a difference that is not statistically significant.

Further, there is no evidence that the project has successfully affected important resilience characteristics, such as livelihood diversification, and the range of crops on which a household depends. The latter warrants further investigation, particularly as mentioned above, there is evidence that the project households have greater dietary diversity than their comparators.

For the livelihood diversification characteristic, the cut-off is whether the household is at least 50 per cent dependent on at least two different livelihood activities that are assumed to be significantly drought or flood tolerant. When examining the underlying data (not shown here) on the *total number* of livelihood activities in which each household engages, both the project and comparison households are, on average, engaged in three different activities. This result, taken in conjunction with the diversification indicator, shows that while households appear to have a diverse livelihood base in terms of the raw *number* of activities, the *nature* of these activities is still highly susceptible to drought or flood. There is, therefore, no evidence of a difference between the intervention and comparison households in terms of livelihood diversification into more *drought or flood tolerant* activities.

As one of the key project interventions was provision of improved cereal seeds and banana plantations, it is interesting to compare the proportion of households cultivating various crops in the intervention and comparison villages. Figure 5 illustrates these differences.

Figure 5: Percentage of HHs cultivating various crops
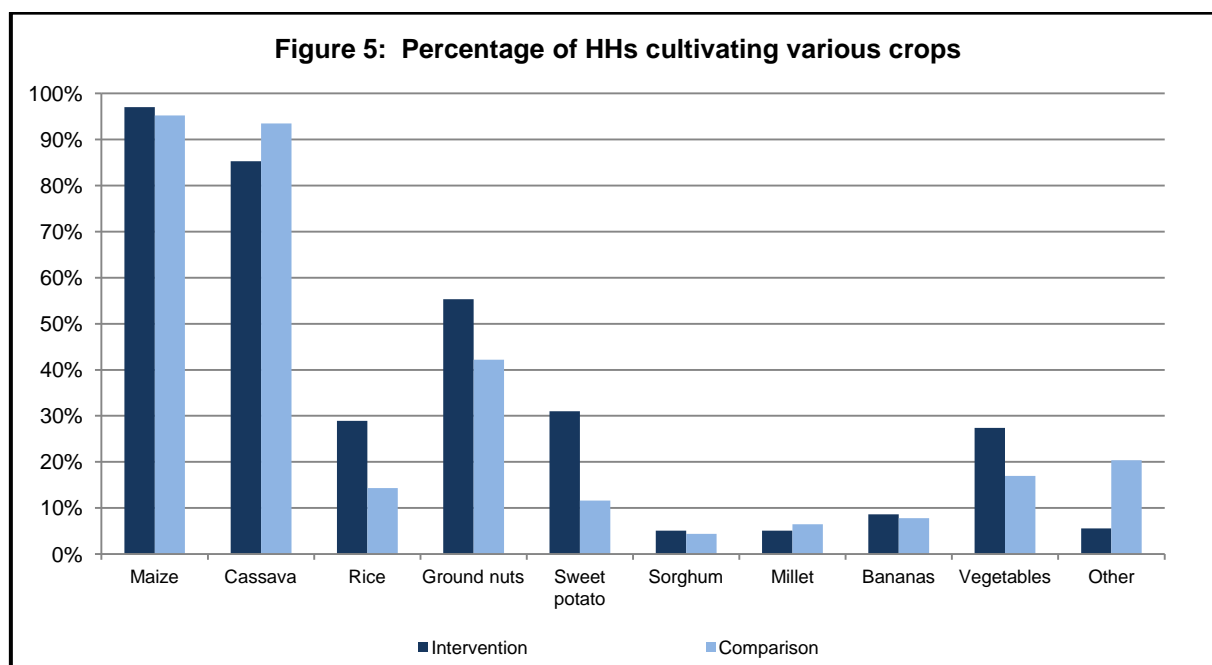
The most significant difference between the intervention and comparison households is the proportion of households growing sweet potatoes. Over 30 per cent of project households reported growing sweet potatoes, compared to 10 per cent of comparison households. Statistically significant differences are also evident for rice, ground nuts and other vegetables. Interestingly, a significantly smaller proportion of households in the intervention villages reported cultivating cassava. Perhaps most interesting is still the very small proportion of

households reporting cultivating bananas. Despite the intervention to provide banana suckers, only eight per cent of project households reported cultivating bananas in the preceding year. What the graph does not show is that this was an increase from four per cent of project households cultivating at baseline (2009). However, there is no evidence that the project has effected a significant shift to banana cultivation.

The final characteristic of livelihood viability is an indicator of a household's wealth status – as measured by asset ownership. For this indicator, there is no clear difference between households in the project and comparison villages. Supporting analyses (not shown here) including assessing changes in a household's wealth status between 2009 and 2012, confirm that there is no significant difference between the intervention and comparison households in asset wealth.

Dimension 2: Innovation potential

G

Data were collected on five characteristics falling under the innovation potential dimension. On average, the supported households scored positively on 57 per cent of the five characteristics, compared to 44 per cent for comparison households. This difference is highly statistically significant, indicating a positive project effect on the characteristics that make up the innovation dimension.

Figure 6 presents the percentage of households scoring positively on each of the indicators in the innovation potential dimension. The indicators have been ranked for the intervention population from most deprived to least deprived. As is evident, there are clear differences between the proportions of households scoring positively on the different characteristics. Interestingly, households scored most positively on innovation practice, and least positively on access to markets.


Figure 6: Percentage of HHs scoring positively on characteristics of the innovation potential dimension
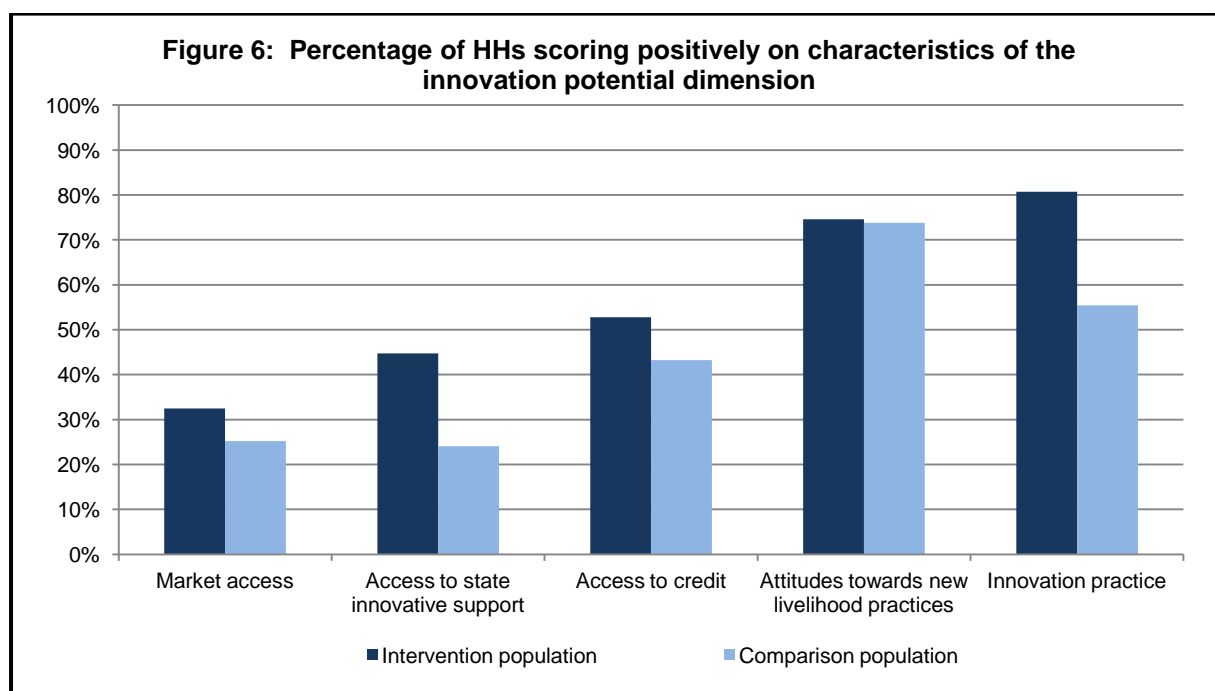
The 'access to state innovative support' characteristic was one of the indicators in which households scored least positively. However, the analysis shows that all four of the adjustment methods estimate a highly significant difference between the proportion of intervention and comparison households above the cut-off, i.e. they reported having received

support from government extension programmes and found the support helpful. Assuming there are no geographical differences in how state support is made available to households, this may indicate that the project has successfully affected the way in which households engage with this type of support. However, an alternative explanation may be that respondents were confused, and that in this instance they were actually referring to support received from Oxfam, rather than from state extension workers. This will require further follow up with the project team.

Just over half of project households scored positively on the access to credit measure, i.e. reporting that they would be able to access a modest-sized loan if required, compared to 43 per cent of comparison households. However, the difference between the groups is not significant. Similarly there was no significant difference in the proportion of households reporting no severe issues in accessing markets or market information.

It is interesting to note that while the proportion of households scoring positively for their attitudes towards trying new livelihood practices is very similar between the intervention and comparison households, there is a highly significant difference in the proportion of households scoring positively in actually *practising* innovative activities. Over 80 per cent of project households scored positively – i.e. they tried at least one new activity (e.g. cultivating new crops), in the previous two years – compared to 55 per cent of comparison households. This clearly implies a strongly successful project effect on innovative practice in supported households.

Such a strong effect warrants further analysis. Figure 7 presents the proportion of households that have tried a variety of activities for the first time in the two years leading up to the data collection. These are the same activities reported on under the 'innovation practice' indicator.

Figure 7: Percentage of HHs implementing activities for the first time
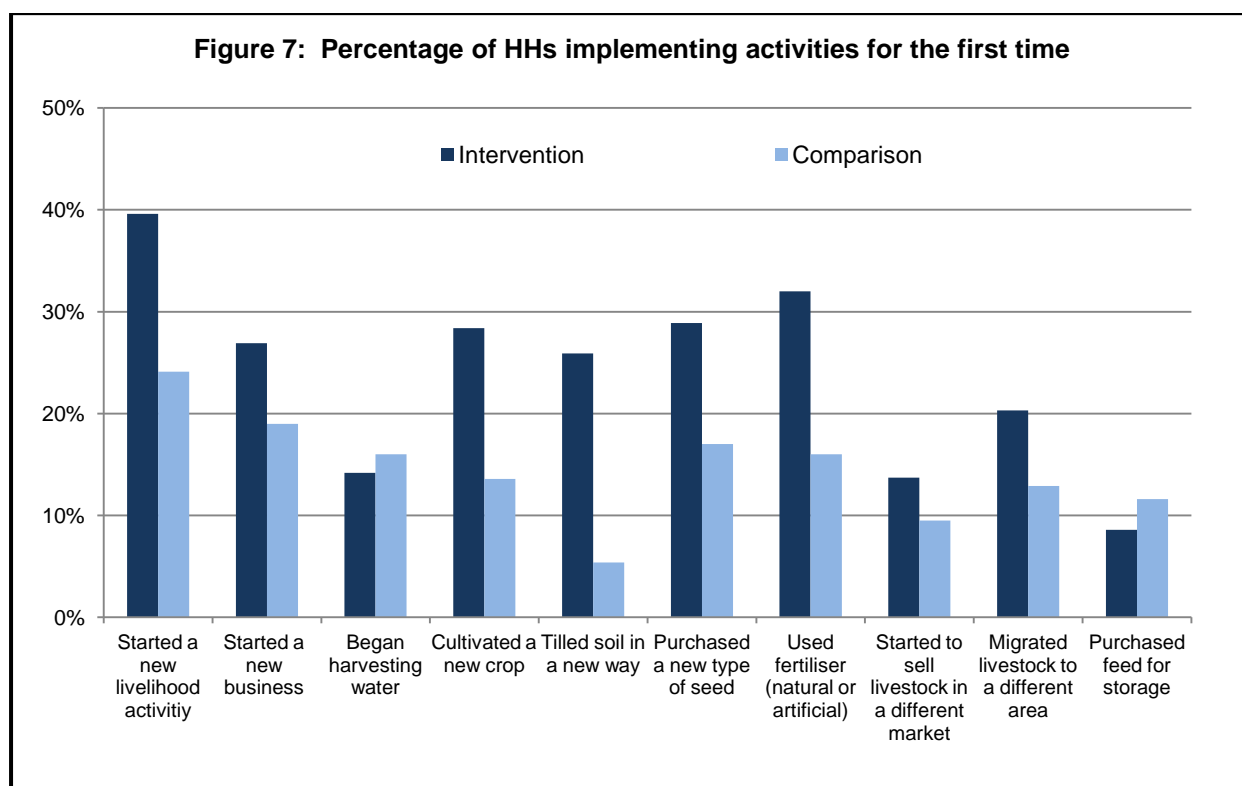
As is evident from the graph, just less than 40 per cent of project households said they had started a new livelihood activity, 28 per cent had started cultivating a new crop, 26 per cent had started tilling soil in a new way, and 32 per cent reported using fertiliser for the first time. For each of these activities the difference in the proportion of households in the intervention and comparison villages practising each is highly significant. While the differences in the

proportion of intervention and comparison households who have started a new business and migrated livestock to a different area are smaller, significant differences still exist between the intervention and comparison households on these measures.

In summary, this highlights that the project has successfully affected the practice of more innovative activities in the intervention villages.

Dimension 3: Access to contingency resources and support ⬤R

Data were collected on six characteristics falling under the access to contingency resources and support dimension. On average, the supported households scored positively on 38 per cent of the five characteristics, compared to 44 per cent for comparison households. This negative difference is statistically significant, indicating that the project has had no overall positive effect on this dimension, and that the comparison households are significantly better off in this regard.

Figure 8 presents the percentage of households scoring positively on each of the indicators in the access to contingency resources and support dimension.

Figure 8: Percentage of HHs scoring positively on characteristics of the contingency resources and support dimension
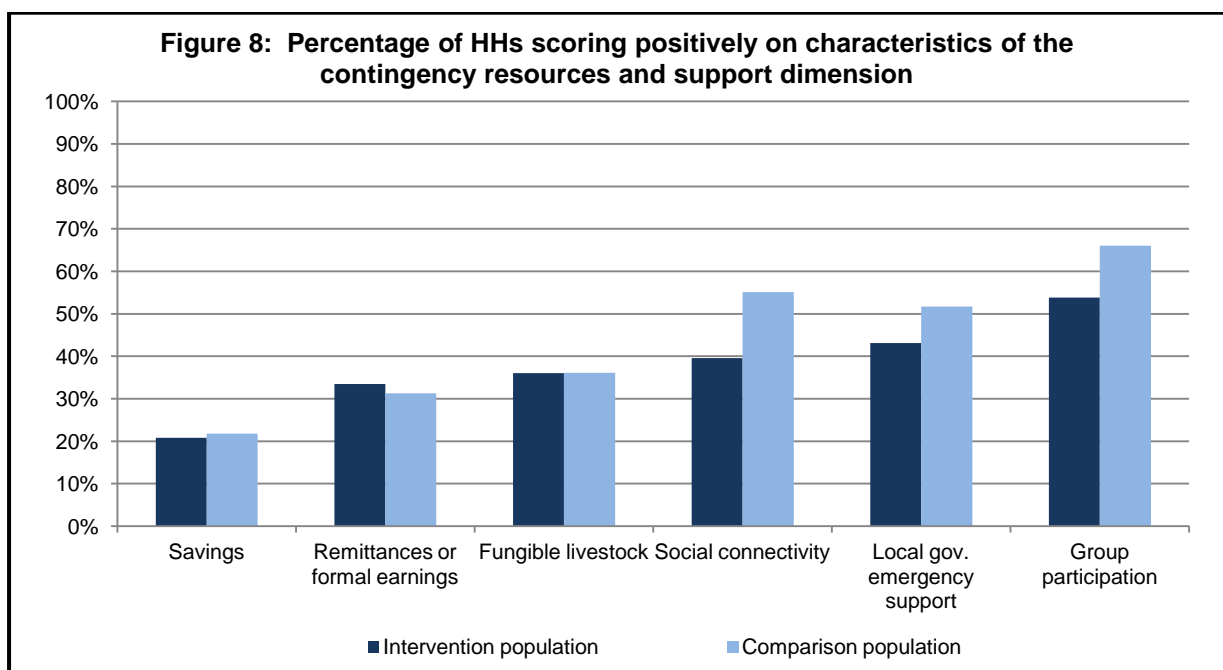
As is evident, the differences between the proportions of households scoring positively on the different characteristics are generally very small. Where slightly larger differences do exist, these tend to be in favour of the comparison households. Interestingly, households scored most positively on issues of group participation. Households scored least positively in regards to their level of savings.

It can be clearly seen that more of the comparison households reported actively participating in community groups than did the intervention households. The negative difference is highly statistically significant, indicating no positive project effect on group participation – indeed, the comparison households are actually better off in this regard.

Particularly interesting is the analysis of the type of groups in which households are participating. Figure 9 illustrates the proportion of households that participate in the various groups appropriate to the context.

Figure 9: Percentage of HHs participating in various community groups
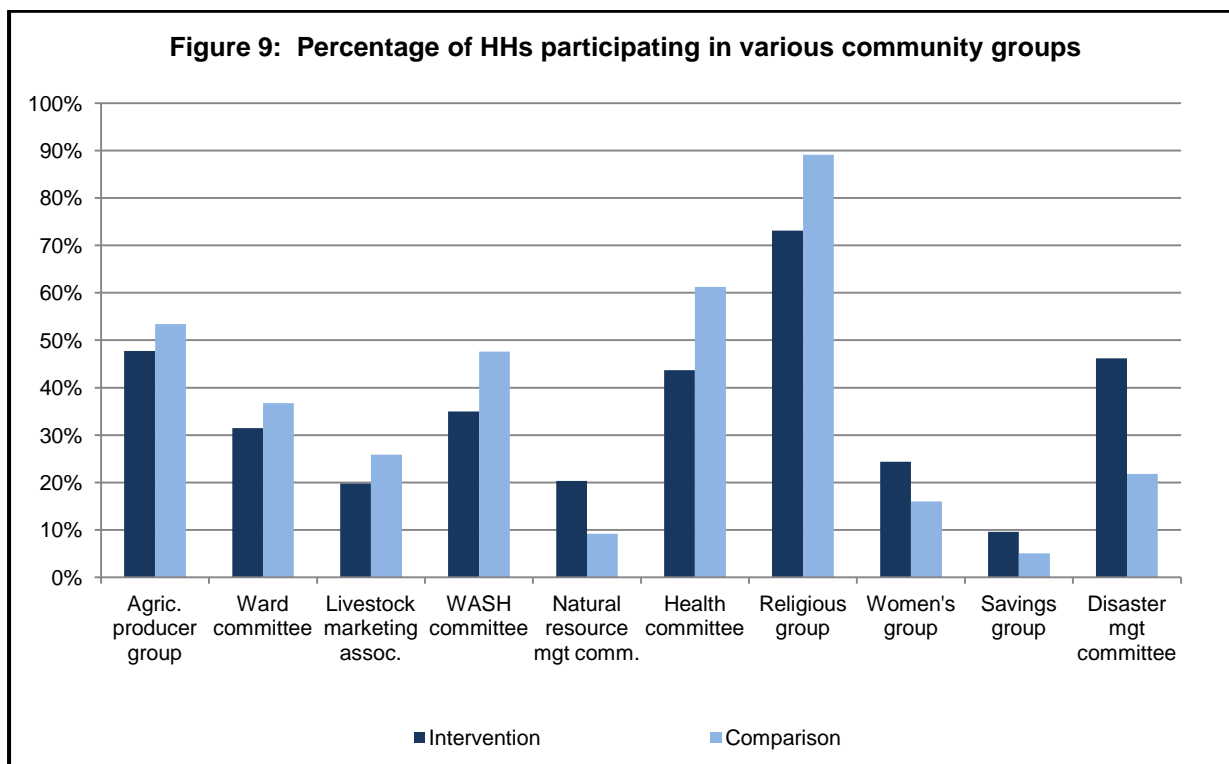
It is important to consider the group memberships that the project was particularly trying to affect. So while there is no overall positive effect on active group membership among the project households, there are clear – and significant – differences in the proportion of households participating in the community disaster management and natural resource management committees. These are the committees particularly targeted by interventions connected to this project. However, for the majority of community-based groups, households in the comparison villages were found to be more active and participatory.

It is interesting to note that the result for the social connectivity characteristic is corroborated by the previous result related to the group participation characteristic, i.e. the comparison households are significantly better off in this regard. The measurement of this characteristic looks at how respondents perceive the strength of their social support system. For example, questions consider: how confident respondents are that neighbours, friends or relatives would support them in times of difficulty; their involvement in important meetings in the community; and other characteristics related to the household's social interaction in the community. Overall, 40 per cent of project households scored positively for this measure, compared to 55 per cent of comparison households.

Further, there is also no evidence of a positive project effect in regard to how households perceive the efficacy of the local government support system in the event of a disaster. While this issue may have not been under the direct jurisdiction of the project, it is still important to note that only 43 per cent of project households had confidence in the local government disaster support measures, compared to 52 per cent of comparison households.

As mentioned, households scored least positively in relation to the level of savings available to household. Households were not asked directly for the monetary value of their savings, but were instead asked, if they had a crisis and had to live on their cash savings without other income sources, how long they would be able to do so. Just over a fifth of the intervention households scored positively on this measure, meaning that they could live from their savings for more than 7 days. No significant differences between the project and comparison households on this measure are evident.

The final two characteristics analysed in this dimension are the availability within the household of remittances or formal employment, and the availability of fungible livestock, such as goats or poultry. In both cases, approximately one-third of intervention and comparison households scored positively, with no significant differences between the two groups.

Dimension 4: Integrity of the natural and built environment   R

Six characteristics were identified for the integrity of the natural and built environment dimension. On average, both the intervention and comparison households scored positively on just less than half of the five characteristics.

Figure 10 presents the percentage of households scoring positively on each of the indicators in the integrity of the natural and built environment dimension.

Figure 10: Percentage of HHs scoring positively on characteristics of the integrity of the natural environment dimension
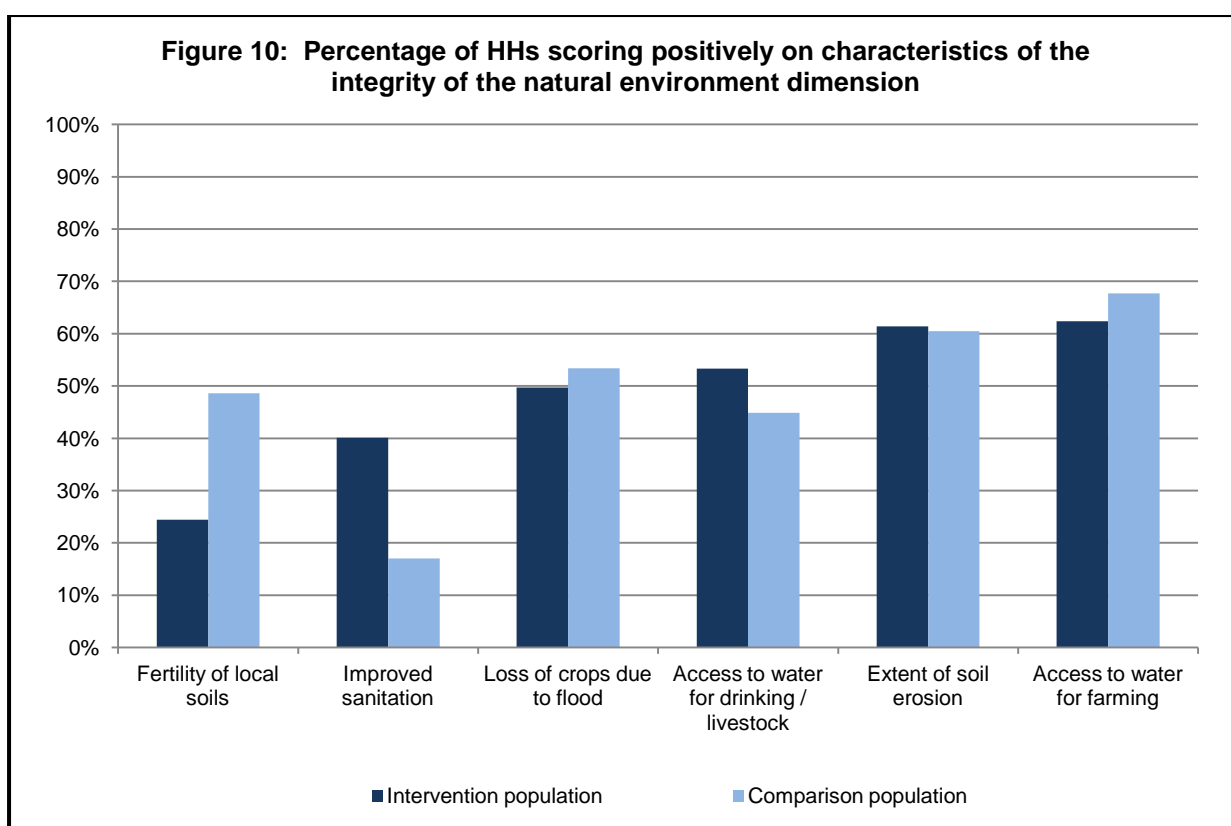
As is evident, with the exception of two indicators, the differences between the proportions of households scoring positively on the different characteristics are negligible. Interestingly, households scored most positively on aspects related to access to water for farming and soil erosion, whereas households scored least positively on how they perceived the fertility of their local soils.

In terms of the households' perception of the fertility of their agricultural land, almost a quarter of project households reported the fertility had either stayed the same or improved – therefore, almost 75 per cent reported some decline in soil fertility over the past two years. This compares to almost 50 per cent of comparison households – a difference that is statistically significant. This suggests that the project households are significantly *worse off* than the comparison households in this regard.

The majority of project and comparison households scored positively for the soil erosion characteristic – i.e. they responded that that their land was not severely affected by erosion. The differences between the groups are negligible and not significant, indicating no positive project effect on this particular characteristic.

Just over 60 per cent of intervention households reported either irrigating their land in the last year, or would be able to water at least part of their land in the event of a drought. The difference between the intervention and comparison household is not significant. This therefore indicates there is no evidence that the project has successfully affected the way in which households are able to access water for agriculture. A different picture emerges in terms of how the project has increased access to water for drinking and livestock. Just over half of intervention households (53 per cent) reported no difficulties in accessing water for themselves or their animals during the dry season of 2012. This compares to 45 per cent of comparison households – a difference that is statistically significant across all four of the estimation models. This indicates that the project has positively affected supported households' ability to access water for their own drinking or livestock watering purposes.

The 'loss of crops due to flooding' characteristic is very important in terms of this project's aims and objectives. For a household to score positively on this measure, they had to report losing less than half of their harvest due to the flooding that occurred in 2012. Overall, 50 per cent of supported households lost *less* than half of their crops, compared to 53 per cent of households in the comparison villages. In reversing this measure, it is sobering to consider that half of the intervention households and 47 per cent of comparison households lost more than half of their harvest due to the flooding. The differences between the intervention and comparison households are not significant, indicating that the project did not positively affect the loss of crops by supported households.

There is, however, strong evidence of project impact in regard to the use of improved sanitation facilities. This is an important aspect to consider, especially in areas prone to frequent flooding. Just over 40 per cent of project households reported using improved sanitation, compared to 17 per cent of comparison households – a difference that is highly statistically significant. This indicates that the project has successfully affected the sanitation used by project households. It will be important to follow up with the project team to consider the specific interventions that may have contributed to this positive result, as this was not a primary project intervention.

Dimension 5: Social and institutional capability ⬤ G

The final dimension of resilience considered in this Effectiveness Review is the capability of institutions in the community. On average, the supported households scored positively on just less than two-thirds of the seven characteristics that make up this dimension, compared to 48 per cent for comparison households. This difference is highly statistically significant, indicating a strongly positive project-effect on the characteristics that make up this dimension. The remainder of this subsection will explore what particular characteristics are driving this difference.

Figure 11 presents the percentage of households scoring positively on each of the indicators in the social and institutional capability dimension.

Figure 11: Percentage of HHs scoring positively on characteristics of the social and institutional capability dimension
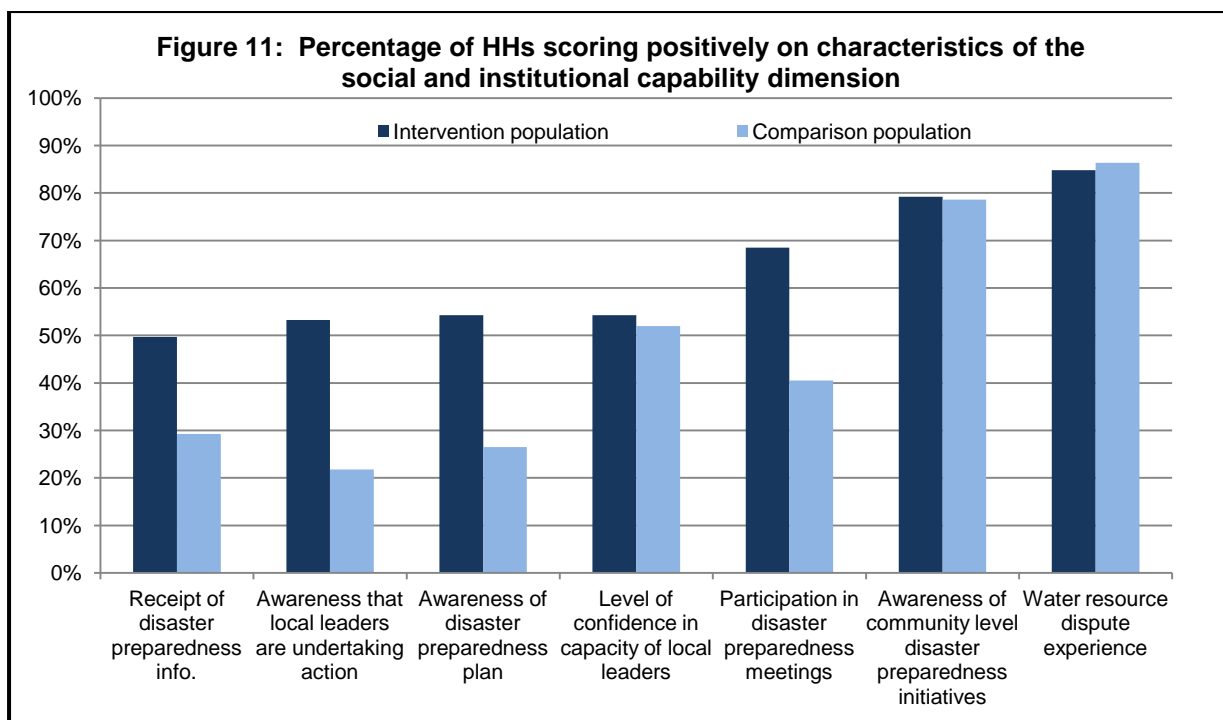
Households scored most positively on aspects related to their experience of water-resource disputes and awareness of community-level disaster preparedness activities, whereas households scored least positively in receiving disaster preparedness information. Given the focus of the project under review, it is particularly interesting to compare the proportion of households who are aware of community-level disaster preparedness activities, with those who have participated in preparedness meetings, received preparedness information, or are aware of any preparedness plan. While the supported households did not score particularly well on these latter characteristics, they are clearly better off in these regards than households in the comparison villages. It is worth pointing out that the majority of all the interviewed households said that they had not been involved in a dispute over access to water in the previous two years, hence resulting in strong performance among both groups on this measure.

In Figure 11 we see that just over half of intervention households score positively in terms of their awareness of a community disaster preparedness plan and their receipt of disaster preparedness information. Over two-thirds of intervention households reported participating in disaster preparedness meetings. The differences between the intervention and comparison households in each of these characteristics are highly statistically significant. Similar differences emerge in terms of respondents' awareness that local leaders are undertaking action. It will be important to clarify whether the relatively low proportion of households scoring positively, particularly on the former two characteristics, is a result of only a subset of villages preparing disaster preparedness plans or holding preparedness meetings. From an initial analysis of the data, it does not appear that this is the case. While there are some differences between the villages – with Kaama and Mutalaeiti scoring lower, and Tapo and Liyoyelo scoring higher – no project village scored lower than 40 per cent on either of these two measures. Regardless of this, the results provide strong evidence that the project overall, has successfully affected these particular outcomes.

It is interesting to note that while scores are lower for aspects related to the more formal structures of community-level disaster-preparedness *planning* (see above), almost 80 per cent of supported households are aware of community-level *activities* that are intended to mitigate some of the effects of flooding and drought. This figure is very similar to the proportion of households scoring positively in the comparison villages, and therefore the difference is not significant. With both intervention and comparison households scoring highly on this measure,

this may indicate pre-existing DRR activities in the comparison villages. As a result it is difficult to estimate the effect of the project on this measure. This is supported by the results shown in Figure 12, which provides a breakdown of the particular activities for which respondents were asked to report on in their community. A high proportion of both intervention and comparison households report canal clearing and seed storage – both key project activities. Interestingly, comparison villages were more likely to have implemented tree-planting and rainwater harvesting interventions.

Figure 12: Percentage of HHs reporting awareness of various drought-preparedness activities
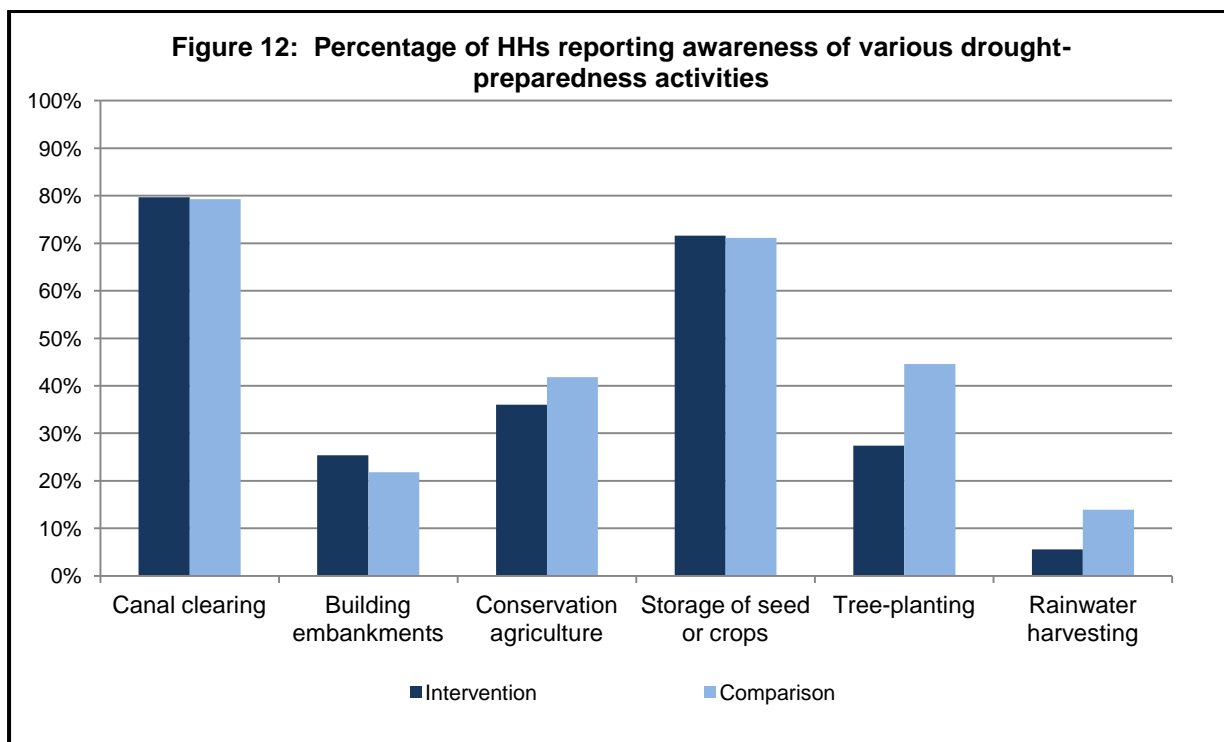
No significant differences were detected in the proportion of households reporting disputes related to access to or use of water.

The final characteristic to review in this dimension is the level of confidence in the capacity of local leaders to provide leadership and support in times of crisis. Just over half of intervention and comparison households scored positively on this measure. The differences between the groups are not significant, indicating no positive project effect on people's confidence in local leaders.

Conclusions

This Effectiveness Review found evidence that the 'Community-Led Disaster Risk Reduction Project' has positively affected several characteristics assumed important for promoting resilience among the intervention population. In particular, even after controlling for measured differences between the intervention and comparison households, the former performed between eight to 13 percentage points and four to six points better than the latter on Oxfam GB's global ARR indicator and the Base Resilience Index, respectively. Such performance in relation to the global indicator shows that 64 per cent of surveyed intervention households demonstrate greater ability to reduce risk and adapt to emerging trends and uncertainty.

Data were collected on a total of 31 indicators under five dimensions. Separate indices were created for each of these dimensions, and the intervention population was found to be better off than the comparison population on all five of them. Interestingly, evidence of impact was strongest for the 'access to contingency resources and support' and 'social and institutional

capability' dimensions, and less for the 'livelihood viability' dimension.

Table 1 shows that out of the 31 characteristics, statistically significant differences in favour of the intervention population were identified for 10 of them. The table also displays which of the characteristics were directly targeted by the project and those related to their intervention logic, as presented in Section 2. Out of the 12 characteristics directly targeted by the project, there is evidence that the projects successfully affected six of them. And, out of the 24 characteristics connected to the projects' intervention logic, there is evidence that nine were positively affected. In this light, the findings of the Effectiveness Review are reasonably positive.

In looking at more detail at the results in Table 1, there are some noteworthy points to be made. A first, overarching point is that some of the largest differences between the intervention and comparison households were in more output-related measures, such as participation in disaster-preparedness meetings. There is little evidence that these activities have yet resulted in changes at higher levels of the logic model presented at the start of the report. For example, there was no evidence that the project has affected important resilience characteristics, such as food security, livelihood diversification, flood preparedness practice, and level of savings. It is particularly interesting to note that the lowest scores in Table 1 tend to be reserved for these particular characteristics.

It is also important to note that while there are differences between the intervention and comparison households in the measures related to receipt of disaster-preparedness information or awareness of community-level plans, the overall scores are reasonably low. Approximately 50 per cent of project households scored positively for these measures, highlighting that there may be more work required in disseminating this important information more widely.

These observations form the basis of some of the learning considerations discussed below.

Programme learning considerations

While some of the findings from this Effectiveness Review are positive, there are additional lessons emerging from the results that can be applied to other projects of this type in Zambia and elsewhere. The Zambia country team and the project team in particular are encouraged to consider the following:

- ***Consider further research to evaluate the effects of advocacy efforts connected to this project.***

   As mentioned in the introduction to this report, the Effectiveness Review only considered the impact of the community-level interventions connected to this project. One key intended outcome from the wider project was to 'improve government capacity to lead and manage comprehensive and effective disaster risk reduction and emergency response from local to national levels'. As noted in the report, the proportion of households – particularly in comparison villages – who knew how to access state adaptation support, or had confidence in the quality of such support, was very low. These results indicate there is more work required in both improving the linkages between communities and local government support, and in strengthening the support offer from state institutions. It is interesting to note that the results for the former were more positive in the intervention villages, indicating a positive project effect on these particular issues. Findings from further research should help highlight how and why the project has positively impacted these particular

results, and how advocacy efforts across the district and beyond can best be targeted.

- ***Explore how to involve community members more widely in community-level drought preparedness activities, and to ensure that training and early-warning information is fully disseminated.***

While the project was found to have had some effect on the distribution of disaster preparedness information to community members, the fact that only half of households reported receiving or being aware of such information is a cause for concern. This suggests that there is still scope for further embedding these activities in the life of the community, and for ensuring that all households are involved and can fully benefit.

- ***Continue monitoring changes in behaviour and experiences of households in the project communities, to learn whether the project activities will eventually result in higher-level changes in risk-reduction behaviour.***

An important observation arising from the results of this Effectiveness Review is that most of the characteristics on which the projects appear to have had impact are those directly connected to project outputs: receipt of early-warning information, involvement in community-level preparedness planning, and so on. There is little evidence that these successes have as yet resulted in higher-level changes in risk-management practices or households' vulnerability. In particular, households that received early-warning information before the flooding of 2012 were no more likely to take key preventative actions. Perhaps as a consequence, the losses suffered by these households in that year were no different from those in comparison communities.

It is possible that more time is needed for people to build trust in the early-warning information and community-level planning structures established under this project, and so incorporate them into their household-level decision-making. In any case, it will clearly be important to continue monitoring the experience of households in the project areas and the decisions they make, to understand the extent to which any further changes come about.