
RESILIENCE IN MALI

Evaluation of increasing food security

Effectiveness Review Series

2013/14



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EXECUTIVE SUMMARY

Oxfam GB's Global Performance Framework is part of the organisation's effort to better understand and communicate its effectiveness, as well as enhance learning across the organisation. Under this Framework, a small number of completed or mature projects are selected at random each year for an evaluation of their impact, known as an 'Effectiveness Review'. One key focus is on the extent they have promoted change in relation to relevant Oxfam GB global outcome indicators.

The Effectiveness Review, which took place in southern Mali in March and April 2014, aimed at evaluating the impact of the 'Increasing Food Security' project. In fact, as designated by Oxfam, this project applied to two related initiatives aimed at building food security and resilience among vulnerable people in Mali. The 'Food Facility' project was implemented between in 2010 and 2011 in partnership with Save the Children, the Institut d'Economie Rurale (IER) and the Mouvement Biologique Malien (MoBioM), providing cash transfers, training and agricultural inputs. This was a pilot initiative, intended to test a model for carrying out cash transfers, generate learning, and provide a basis for advocacy with government and donors. Six hundred households in the commune of Fakola, located in the *cercle* (district) of Kolondiéba in southern Mali, received support, as did 400 households in two communes in the cercle of Bourem in northern Mali. The current 'Food Security Support Project' (known by its French abbreviation as PASA 5) is implemented in partnership with MoBioM, Welthungerhilfe, the Groupe Action pour l'Enfance au Sahel (GAE-Sahel) and local organisation, Jiekataanie. Since June 2012, this project has supported households in four communes in the cercle of Kolondiéba, again with a combination of cash transfers, training and agricultural inputs. Other activities included in the PASA 5 project include developing land in several communities for kitchen gardening, training and supporting women's groups in the production of infant formula, broadcasting a radio show and using the 'Reflect' approach to community mobilisation to promote positive agricultural practices and good nutrition.

Evaluation approach

This Effectiveness Review used a quasi-experimental evaluation design to assess the impact of the activities among of the Food Facility and PASA 5 projects among those households directly supported by these projects. For security and logistics reasons, this Effectiveness Review was carried out only in the cercle of Kolondiéba, not in Bourem. Nineteen of the 44 communities in the cercle of Kolondiéba where the two projects were implemented were selected to be included in the Effectiveness Review, based on their feasibility for evaluation. The larger settlements in which the project was implemented, and those lying close to the main town of Kolondiéba and in the northern part of the project area, were excluded from the Effectiveness Review.

Survey respondents were selected at random from among the lists of those who received direct support from the PASA 5 project. These direct participants were divided into two groups: the 'very poor' households, who were provided with cash transfers, and the 'poor' households, who were provided with agricultural inputs and support. The impact of the project activities on the wider population of the communities was not assessed. In total, 150 'poor' households and 152 'very poor' households were interviewed across the 19 project communities. For comparison purposes, 500 households were interviewed in nearby communities where the project had *not* been undertaken. At the analysis stage, the statistical tools of propensity-score matching and multivariate regression were used to control for apparent baseline differences between the households in the project and comparison communities, to increase confidence when making estimates of the project's impact. The household survey was

complemented by a number of focus group discussions to provide deeper insights into the impact of the project than could be captured in the quantitative survey.

Results

The survey results provide good evidence of the impact from the various project activities on household livelihoods. In terms of households' agricultural activities, it is clear that those in the project communities were more likely to have used improved seeds during the last agricultural season, and that this was not restricted only to those who had received donations of improved seeds that year. There is also some evidence of greater use of organic fertiliser in the project communities. However, the area of land cultivated and the total production of staple crops does not appear to have changed as a result of the project. Nor was there an indication of an effect on the number of months during which households were able to cover their food needs from their own production.

Key results of this Effectiveness Review

Outcome area	Evidence of positive impact		Comments
	'Very poor' households	'Poor' households	
Adoption of improved agricultural practices	Yes	Yes	Use of improved seeds was higher among those in the project communities than in the comparison communities – and not only among those who received distributions of seeds directly from the project.
Production of staple crops	No	No	Total quantity of staple crops produced in 2013 did not differ between those in the project and comparison communities.
Production from a kitchen garden	Yes	Yes	Households in the communities where the kitchen garden intervention was implemented produced a considerably wider range of crops than those in other communities.
Borrowing and indebtedness	No	Yes	'Poor' households supported by the project relied less on borrowing during the year prior to the survey.
Livestock ownership and savings	Yes	Yes	'Very poor' households supported by the project were more likely to own livestock, but 'poor' households were less likely. Both groups are more likely to have a useful amount of savings than comparison households.
Dietary diversity	Yes	Yes	Those supported by the project were consuming a wider range of food types than those in comparison communities. This effect is not restricted to those supported in kitchen gardening.
Total food consumption	Yes	No	Total food consumption among the 'very poor' households appears to be approximately 16 per cent higher than among the corresponding households in comparison communities.
Indicators of resilience	Not clear	No	There is evidence of an impact from the project on some specific indicators of resilience – but little evidence of impact on the overall index of resilience.

Results apply to the households who were directly supported by the PASA 5 project in either the 'very poor' or 'poor' groups, in the 19 communities included in the project. The 19 communities include all those in the communes of Fakola and Kadiana in which the PASA 5 project was implemented, except for the four largest communities, as well as three communities in the commune of Kolondiéba that are not located within the immediate vicinity of the town of Kolondiéba. The impact on community members other than those directly supported in either the 'very poor' or 'poor' groups is not covered by this Effectiveness Review.

In communities where the PASA 5 project has supported the development of land for kitchen gardening, nearly two thirds of the households interviewed were engaged in this activity. Households in those communities had much larger kitchen garden plots and were producing a significantly larger range of crop types than those in the other project communities or in the comparison communities. However, it should be noted that on average they reported that water had been available for kitchen gardening during only six months of the year.

One apparent effect of the cash transfers is that the 'very poor' households that received them were able to delay making sales of their crops until some time after the harvest season had ended. There are also some indications of households in the project communities generating higher revenue from crop sales than those in the comparison communities, but the evidence for this is not conclusive.

Survey respondents were also asked for some basic information about their borrowing, saving, and ownership of livestock. A clear positive result is that households supported by the project in both the 'very poor' and 'poor' groups were much more likely to have a significant amount of savings at the time of the survey than were the comparison households. In addition, the 'poor' households were less likely to be borrowing: only 40 per cent reported having borrowed during the 12 months prior to the survey, against 45 per cent of the comparison group. In particular, they were considerably less likely to report having borrowed in order to buy food or pay for medical expenses.

Some of those in the 'very poor' group reported having used their cash transfers to invest in livestock – and correspondingly, they were more likely to own livestock at the time of the survey than were the 'very poor' comparison households. On the other hand, the 'poor' households supported by the project were less likely to own livestock than the corresponding comparison households.

One of the most important outcomes to evaluate in this Effectiveness Review was the project's impact on food security. Some standard indicators of food security were included in the survey, but did not provide any clear evidence of an effect from the project. However, survey respondents were also asked to provide details about all the food consumed by their household during the seven days prior to the survey. The detailed data derived from these questions show that households interviewed in the project communities were consuming a wider range of food types than those in the comparison communities. Among the 'very poor' households, this effect on dietary diversity is most clearly visible among those in the communities where the kitchen garden initiative was implemented – but it seems to be present among the wider population as well.

The food consumption data was also used to create an estimate of the total value of all food consumed in each household during the seven days prior to the survey. The results suggest that the 'very poor' households in the project communities were consuming significantly more food (approximately 16 per cent more, by value) than those in the comparison communities. This appears to represent a sustained effect of the cash transfers on household food consumption, several months after the last transfer was made.

On the other hand, there was no indication of any such difference in food consumption between the 'poor' households in the project and comparison communities. Neither did either the 'very poor' or 'poor' households appear to be spending more on health or education, nor have increased asset ownership than those in the comparison communities.

The project activities were intended not only to provide short-term support to vulnerable households, but also to build their resilience to shocks and stresses. One indicator of success in this respect was to examine the coping strategies adopted by households

during the lean season of 2013. Households were asked about whether they adopted a series of coping strategies, some of which are quite common in the project area and may be a normal part of households' risk management – such as receiving remittances or migrating for work – and some of which are clearly negative – such as selling assets or removing children from school. Unexpectedly, households in the project communities (among both the 'very poor' and the 'poor' groups) said that they had adopted more coping strategies during 2013 than had those in the comparison communities. This applied both to coping strategies regularly used by households and to more unusual strategies adopted to cope during that specific season. The implication from this result, that households in the project communities were more vulnerable during 2013 than those in the comparison communities, contrasts with evidence from other outcomes discussed above (such as the higher food consumption among the 'very poor' households in the project communities, and the greater dietary diversity among both 'very poor' and 'poor' households). It is possible that this apparent difference is, in fact, a reflection of those supported by the project generally feeling more confident in discussing the coping strategies they had adopted than were the comparison respondents.

A full evaluation of the project's effect on people's resilience to shocks and stresses would only be possible by returning to observe participants' situations some years after the end of implementation of the project. Implementation of the PASA 5 project was still ongoing at the time of the Effectiveness Review, so this was not possible. Instead, a series of 16 characteristics were identified that are thought to be associated with resilience at an individual, household or community level, and which could be observed during the Effectiveness Review. Some of these indicators were directly related to the project activities; others were unlikely to have been affected by the project, but were included to provide an overall view of households' resilience. The full list of indicators, and a summary of the results for each, is shown in the table below.

Characteristics of resilience considered in this Effectiveness Review

Dimension	Characteristic	Connected to project logic?	Evidence of positive impact	
			'Very poor' households	'Poor' households
Livelihood viability	Ownership of productive assets	Yes	No	No
	Crop diversification	Yes	No	No
	Ownership of livestock	Yes	Yes	No
	Livelihood diversification	No	No	No
	Use of improved seeds	Yes	Yes	Yes
	Use of soil conservation techniques	Yes	Yes	Not clear
Innovation potential	Attitudes towards changing practices	No	No	No
	Access to credit	No	No	No
Access to contingency resources and support	Savings	Yes	Yes	Yes
	Social support networks	No	No	No
	Access to a grain bank	No	No	No
Integrity of the natural and built environment	Access to safe drinking water	No	No	No
	Access to irrigation	Yes	Yes	No
Social and institutional capability	Participation in community groups	No	No	No
	Social cohesion in the community	No	No	No
	Confidence in government structures to deal with crises	No	No	No

The 16 indicators of resilience were used to create a multidimensional index of resilience for each household. Households in the 'poor' group were found to score positively on average in 45 per cent of the characteristics of resilience, while those in the 'very poor' group scored positively in 42 per cent of the characteristics. While there are clear differences between the households in the project and comparison communities in terms of several of the characteristics of resilience, there is little evidence of a difference on the index of overall resilience. There is some indication of a small positive effect from the project on the resilience index among the 'very poor' households, but this conclusion cannot be stated with confidence.

Programme learning considerations

Use the results of this Effectiveness Review to contribute to the evidence base on the impacts of cash transfers, in order to inform future decisions on their use by Oxfam and by other actors.

The PASA 5 project has already been important in demonstrating a workable model for providing cash transfers, which has encouraged their adoption by other actors – particularly through the World Bank-funded cash transfer scheme now being implemented in the same area. The results of this Effectiveness Review provide evidence that transfers targeted at 'very poor' households had some sustained effect on their level of food consumption some months after the transfers were made. That cash transfer recipients had delayed making crop sales until later in the year and were more likely to have significant savings at the time of the survey are also positive indications. These findings can be used to strengthen the case when advocating for greater adoption of cash-transfer programmes.

Consider conducting further follow-up work to understand the longer-term impacts of these interventions.

While it would be reasonable to assume that the impact of providing cash transfers would be visible in the short term, the effects of providing agricultural support may take longer to become clear as participants gain experience and trust in the use of new practices and technologies. Some of the 'poor' households who were supported in agricultural production by this project had been receiving that support only in the year prior to the Effectiveness Review, while others had received the support two years previously. It is possible that the full effects of the provision of agricultural training and inputs had yet to become clear at the time the survey was conducted – particularly among those supported during the previous year. (There are no clear differences in outcomes between those who were supported in the first year of the project and those in the second year, but this analysis was limited by a small sample size.) A better understanding of the longer-term effects of the project could be gained by carrying out a follow-up evaluation after another year or two has passed.

Seek to understand how the sharing of resources provided under a project affects the targeting of resources and what this means for monitoring and evaluating the outcomes of a project.

There are some interesting indications from this survey of significant redistribution within communities of the tangible forms of support provided by the project. Sixteen per cent of respondents in the project communities reported that others had shared part of a cash transfer they had received with them. The survey data and focus groups both indicated that the improved seeds had also been shared within the communities, rather than being used exclusively by the households they were given to. It would be useful in planning future interventions to have a better understanding of how this sharing is carried out, and what its consequences are. This behaviour may be seen to undermine the targeting strategy employed by projects, but it certainly means that a full

understanding of the impact of a project has to take into account wider impacts than simply those among the direct project participants. Further investigation of how this sharing behaviour affects social relations – for example, whether this tends to empower the recipients of support or whether it increases stress on them by forcing them to prioritise between their own needs and those of others – would also be valuable.

1 INTRODUCTION

Oxfam GB's Global Performance Framework is part of the organisation's effort to better understand and communicate its effectiveness, as well as enhance learning across the organisation. Under this Framework, a small number of completed or mature projects are selected at random each year for an evaluation of their impact, known as an 'Effectiveness Review'. One key focus is on the extent they have promoted change in relation to relevant Oxfam GB global outcome indicators.

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This report presents the findings of the Effectiveness Review. Section 2 briefly reviews the activities and the intervention logic of the project. Section 3 describes the evaluation design used, and Section 4 describes how this design was implemented. Section 5 thereafter presents the results of the data analysis, based on the comparison of outcome measures between the intervention and comparison groups. Section 6 concludes with a summary of the findings and some considerations for future learning.

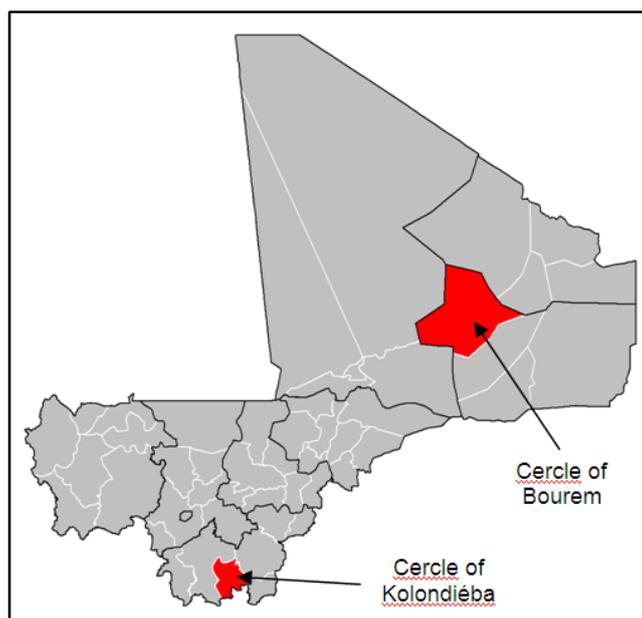


Figure 1.1: Map of Mali

2 PROJECT DESCRIPTION

As described in Section 1, the Oxfam project selected for this Effectiveness Review related to two projects implemented in subsequent years in the cercle of Kolondiéba in southern Mali.

The first, 'Food Facility', project was a pilot initiative carried out by Oxfam in partnership with Save the Children, the Institut d'Economie Rurale (IER) and the Mouvement Biologique Malien (MoBioM). As well as in Kolondiéba, this project was implemented in two communes of the cercle of Bourem, in northern Mali. The objectives of the project were to increase the purchasing power and hence food security of some of the most vulnerable households, to increase agricultural productivity among small producers, and – importantly – to learn lessons about these interventions, in order to influence policy and practice in agriculture and social protection.

To that end, 1,000 of the most vulnerable households across the two cercles were provided with cash transfers for two years (2010 and 2011). All the direct recipients of the cash transfers were women, although many were in male-headed households. The transfers were paid in three instalments during each year, with the first instalment intended to encourage investment in agricultural production, the second instalment to provide for consumption during the peak of the lean season, and the third instalment at harvest time to subsidise short-term consumption so as to prevent households from selling their crops immediately – thus enabling them to realise greater returns by selling later in the year. The majority of the recipients also received training on health and nutrition, household financial management and risk management, and on market seasons.

In the same communities as the cash transfer recipients, a further 550 households were provided with agricultural inputs – including improved seeds and fertiliser – intended to support the cultivation of half a hectare of maize and half a hectare of rice per household. Female-headed households without experience in rice cultivation received more intense support.

The PASA 5 project built on the experience of the Food Facility project to provide support to vulnerable households over a wider area in the cercle of Kolondiéba. The coalition of partners for this project includes MoBioM, Welthungerhilfe, the Groupe Action pour l'Enfance au Sahel (GAE-Sahel) and local organisation, Jiekataanie. The design of two of the components of the PASA 5 project is similar to that of the Food Facility project: 500 of the most vulnerable households (designated in project documents as 'very poor') receiving cash transfers over two years, as well as training on nutrition and financial management, while 1,000 additional households (known as 'poor' households) being supported with agricultural inputs and technical support.

The PASA 5 project has four other components. In nine communities, the project has established zones for market gardening, each of which provides plots to approximately 100 women. These women have also received seeds and other inputs for vegetable production. In several more communities, small groups of women have been trained in the production of infant formula, and have received inputs and support to organise themselves to produce and market this as a source of income. Another component of the project involves using the 'Reflect' approach to community mobilisation to involve community members in awareness-raising on good nutrition. Finally, Welthungerhilfe and Jiekataanie host a regular radio show, which broadcasts messages about agricultural techniques and nutrition throughout the project area, organises demonstrations promoting household nutrition at a community level, and provides

support and capacity building to office holders at community, commune and district level.

The PASA 5 project is implemented in 40 communities across four communes in Kolondiéba, including the commune of Fakola, where the Food Facility project was implemented. The targeting process for each project was carried out separately, but it is estimated that approximately a third of those receiving direct support from the PASA 5 project (in terms of cash transfers or agricultural inputs and training) in the commune of Fakola also received support under the Food Facility project.

Implementation of the PASA 5 project began in 2012, and will continue until late 2014. Lessons learned from the implementation of this – and of the Food Facility project – have already been used to advocate for the wider adoption of cash transfers as a social protection mechanism. In particular, these projects are seen as instrumental in encouraging the World Bank to fund a larger-scale cash-transfer scheme, which is being launched in several communes of the cercle of Kolondiéba during 2014.

It should be noted that this Effectiveness Review considers the impact only on the households who have been directly supported by the PASA 5 project, with cash transfers (the 'very poor' group) or agricultural support (the 'poor' group). For budgetary reasons, the impact among households in the wider community could not be assessed. This has the consequence that the impact of the support to market gardening, the production of infant formula, and the Reflect training cannot be separated in the analysis from the impact of the cash transfers or agricultural support. The impact of interventions that are designed to benefit households across all communities in the area – particularly the radio broadcasts and the capacity-building of district officials – will not be evaluated at all. In addition, the project's impact on generating learning and advocating for greater adoption of cash as a social protection mechanism will not be evaluated here.

3 EVALUATION DESIGN

The central problem in evaluating the impact of any project or programme is how to compare the outcomes that result from that project with *what would have been the case* without that project having been carried out. In the case of this Effectiveness Review, information about the situation of the project participants was collected through a household questionnaire – but clearly it was not possible to know what their situation would have been had they not had the opportunity to participate in this project. In any evaluation, that ‘counterfactual’ situation cannot be directly observed: it can only be estimated.

In the evaluation of programmes that involve a large number of units (whether individuals, households, or communities), common practice is to make a comparison between units that were subject to the programme and those that were not. As long as the two groups can be assumed to be similar in all respects except for the implementation of the specific project, observing the situation of those where the project was not implemented can provide a good estimate of the counterfactual.

An ideal approach to an evaluation such as this is to select the sites in which the programme will be implemented at random. Random selection minimises the probability of there being systematic differences between the project participants and non-participants, and so maximises the confidence that any differences in outcomes are due to the effects of the project.

In the case of the project examined in this Effectiveness Review, the implementation sites were not selected at random. Instead, the partners targeted specific communes that were seen to be the most vulnerable (with the most severe food security problems) in the area. Within those communes, the specific communities where the project was implemented were again selected based on the perceived level of vulnerability.¹ However, it is clear that levels of food insecurity throughout the region are high, and that there are many more communities that can be considered similarly vulnerable and hence where the project activities could have been implemented. This allowed a ‘quasi-experimental’ evaluation approach to be adopted, in which the situation of people in nearby non-project communities was assumed to provide a reasonable counterfactual for the situation of people who had participated in the project.

Within communities selected for implementation, specific households were identified to participate in the project based on their socio-economic level. The identification was made by an assembly within each community, who were guided by criteria adapted from the Household Economy Approach (HEA). For the Food Facility project in Fakola commune, the most vulnerable households were identified for participation. Under PASA 5, two separate groups of participants were identified. The ‘very poor’, those who were seen as the most vulnerable in the community, were selected to receive cash transfers. The individuals within each household in the very poor group identified to receive a cash transfer were women, although they were not all from female-headed households. The ‘poor’ group, who were identified as slightly less vulnerable, were considered to be suitable for receipt of agricultural support.

It should be noted that not all of those who fell under these categorisations within each of the project communities were able to be included in the project – the decision on which households were the most in need and having greatest potential to benefit from the project was made by the community assembly. One possibility would have been to interview for comparison purposes some of these households in the project communities who were identified as ‘very poor’ or ‘poor’ but who did not receive direct support from the project. This approach was not taken for two reasons. Firstly, even

though they were considered to be at a similar socio-economic level to the project participants, there must have been reasons why the community assemblies decided that they were less suitable to benefit from the project. This implies that there are, in fact, differences between the project participants and the other 'very poor' or 'poor' households in their communities, even if it cannot be stated clearly what those differences are. Secondly, it was thought likely that some of these households may have benefited indirectly from the project activities – either through the cash recipients having passed on some of the funds they received to neighbours, or through a general boost to economic activity in the community caused by the project interventions.

It was seen as important, therefore, that the comparison households should be identified from communities other than those directly included in the project. The next challenge, then, was how to identify households in the comparison communities that would be comparable to the 'very poor' and 'poor' households in the project communities who participated in the project. The ideal situation would be to use the same process for selecting households to interview in the comparison communities as was used for identifying project participants in the implementation communities – that is, a community assembly informed by HEA criteria. Fortunately, a very similar process *had* in fact been carried out in recent months in many communities in the cercle of Kolondiéba, to select beneficiaries for the new World Bank-funded cash transfer initiative referred to in Section 2. This selection process for the World Bank project had replicated the selection process used for PASA 5. Although only households identified as 'very poor' were selected to participate in the World Bank project, the process in the communities also involved identifying households who were categorised as 'poor'. The substantial activities of the World Bank project had not begun by the time that the Effectiveness Review survey was carried out. These households who were identified as 'very poor' or 'poor' in communities to be included in the World Bank project were therefore considered to be a reasonably good counterfactual for the 'very poor' and 'poor' households who actually participated in the project under review. As will be discussed in Section 4.1, the choice of which project communities to include in the review was made based on the availability of comparison communities where the World Bank identification process had been carried out.

One major limitation with this approach is that, even though the identification of 'very poor' and 'poor' households followed similar criteria, the identification for the PASA 5 project was carried out in 2012 (and that for the Food Facility project even earlier), whereas that for the World Bank-funded project was carried out two years later, in 2014. It is possible that the households who were identified as 'very poor' and 'poor' in 2014 are not all the same as those who would have been included in those categories in 2012.

For this reason – and to allow for their having been other potential differences between the project and intervention communities in the process for selecting participants – attempts were made at the data analysis stage to improve the accuracy of the comparison. Project participants were 'matched' with households interviewed in the comparison communities who had similar characteristics in 2009 (before either the Food Facility or PASA 5 projects were implemented), including household size, ethnicity, education level, productive activities, and indicators of material wellbeing. Although baseline data were not available in this case, survey respondents were asked to recall some basic information about their household's situation from 2009. Although this recall data is unlikely to be completely accurate, it is thought to enhance the reliability of the comparison used to make conclusions in this report.

The survey data provided a large number of baseline household characteristics on which matching could be carried out. (The characteristics that were used are listed in Appendix 3.) One practical problem is that it would be very difficult to find households in the comparison communities that correspond exactly in all these characteristics to households in the project communities. Instead, these characteristics were used to

calculate a 'propensity score', the conditional probability of the household being in an intervention community, given particular background variables or observable characteristics. Households in the project and comparison communities were then matched based on their having propensity scores within certain ranges. Tests were carried out after matching to assess whether the distributions of each baseline characteristic were similar between the two groups. Technical details on this approach are described in Appendix 3.

As a check on the results derived from the propensity-score matching process, results were also estimated using multivariate regression models. Like propensity-score matching, multivariate regression also controls for measured differences between intervention and comparison groups, but it does so by isolating the variation in the outcome variable explained by being in the intervention group after the effects of other explanatory variables have been accounted for.

It should be noted that both propensity-score matching and multivariate regression rely on the assumption that the 'observed' characteristics (those that are collected in the survey and controlled for in the analysis) capture all of the relevant differences between the two groups. If there are 'unobserved' differences between the groups, then estimates of outcomes derived from them may be misleading. This is a cause for particular caution when interpreting the results of an evaluation for a project in which participants were to some extent self-selected. This point is further discussed when interpreting the results in Section 5 of this report.

4 DATA

4.1 SELECTION OF INTERVENTION AND COMPARISON COMMUNITIES

The PASA 5 project was implemented in 10 communities in each of the four communes of Fakola, Kadiana, Kébila and Kolondiéba. The Food Facility project had previously been implemented only in Fakola, but in all 14 of the commune's communities. For this Effectiveness Review, it was decided to interview project participants from among those who were participating in PASA 5 only. A full list of participants in the Food Facility project was not available at the time of the Effectiveness Review, but approximately a third of those who participated in the PASA 5 project in the 10 communities in Fakola were thought to have received support under the Food Facility project. Unfortunately it was not possible in the dataset to identify which households had been supported by the Food Facility project, so it was not possible to make any separate assessment of the impact of having participated in both projects, as opposed to PASA 5 alone.

As discussed in Section 3, respondents were interviewed for comparison purposes from among those households identified as 'very poor' or 'poor' during the selection process for participation in the new World Bank-funded project. That project was being implemented in several communes in the cercle of Kolondiéba, including Fakola and Kadiana (but not Kébila or Kolondiéba). In each of the communes selected for participation in the World Bank project, all communities in the commune were included.

It was considered important for this Effectiveness Review to make comparisons between communities with similar characteristics – in terms of community size, local topography, and access to infrastructure, such as roads and markets. Not all of the communities in which the Food Facility and PASA 5 projects had been implemented could be included in the Effectiveness Review because no similar communities where the targeting for the World Bank project had been implemented were available for comparison. In particular, the district capital of Kolondiéba is much larger than any other community in the cercle, so it was not considered reasonable to compare households living in or close to Kolondiéba to those in any other communities. For this reason, project participants households in Kolondiéba town, and in most of the villages of Kolondiéba commune, were excluded from the Effectiveness Review. (Three communities in Kolondiéba commune that lie further from the main town were considered suitable for inclusion.) The commune of Kébila lies to the north of the project area, on the road between Kolondiéba town and the main surfaced road, and so was considered to have better access to infrastructure and markets than any locations available for comparison purposes. For this reason, all communities in the commune of Kébila were also excluded from the Effectiveness Review. In the two remaining communes included in the PASA 5 project, Fakola and Kadiana, all the project communities were included except for the four largest. In total, then, the Effectiveness Review was carried out in 19 of the 40 communities included in the PASA 5 project. These communities are listed in Table 4.1.

For comparison purposes, communities in the communes of Bougoula and Tiongui were selected for having similar characteristics to the 19 project communities, as were the seven remaining communities in the commune of Kadiana. It will be recalled that four communities in the commune of Fakola were excluded from the PASA 5 project. However, since those four communities had earlier been included in the Food Facility project, they were not considered suitable for comparison purposes.

4.2 SAMPLING STRATEGY

Within the 19 project communities identified for the Effectiveness Review, respondents were selected at random from the lists of participants in the PASA 5 project. Random selection was made separately for the 'very poor' and 'poor' groups. Even though the number of 'poor' households participating in the project was approximately double the number of 'very poor' households, an equal number of households were targeted for interview within each group, in order to maximise the statistical power to detect results within each group. Within the 'very poor' and 'poor' groups, the number of households selected for interview in each community was proportionate to the total number of participants in that community. The random selection of respondents was made from the lists of project participants in advance of the survey team's visit.

In the comparison communities, lists of the households identified as 'very poor' were obtained from local representatives of the newer World Bank project. Random selection of households to interview was made from these lists, again in advance of the survey team's visit. No such lists were available of the 'poor' respondents. Instead, the survey team worked with informants in each community to make a list of those households that had been identified as 'poor' during the targeting process. Households to be targeted for interview were then selected at random from those lists, using systematic random sampling.

Table 4.1: Numbers of households surveyed

Commune	Project community	Number of project participant households interviewed		Commune	Comparison community	Number of comparison households interviewed	
		Very poor	Poor			Very poor	Poor
Fakola	Diamogo	5	3	Bougoula	Bougoula	27	27
	Djongoni	7	7		Zantoumana	24	24
	Dontréké	5	5		Siana	21	19
	Garanko	4	4		Zoha	14	14
	Kotla	7	9		N'Gokila	10	9
	M'Pièssana	6	7		Tiongou	Tiongou	42
	Soromana	6	6	Sokourani		11	11
Kolondiéba	Boundioba	13	14	Tiampa		16	16
	Niamala	3	5	Goufien		6	7
	Zangouna	3	2	Tiogole	9	7	
Kadiana	Blindio	10	9	Kadiana	Kountio	22	20
	Débèna	15	17		Donfanaba	15	15
	Diendio	11	11		Sanankoro	3	3
	Doubasso	5	4		Sialla	16	16
	Gonkoro	18	18		Torokoro	7	7
	Séblé	3	3		Koukonnani	9	9
	Sikoro	5	4		Tionkourani	4	4
	Tié	17	17				
	Warakana	7	8				
Totals		150	152	Totals		256	244

4.3 ANALYSIS

Households in the project and comparison communities were compared in terms of their demographic characteristics, livelihoods activities and economic situation in 2009. These data were based on information recalled during the questionnaire or reconstructed from the household composition at the time of the survey.

The full comparison is shown in Appendix 2. Some important differences were found between the households in project and comparison communities. For example, 27 per cent of the 'very poor' households in the project communities were female-headed, compared to only 12 per cent in the comparison communities. There were also significant differences between the households interviewed in the project and comparison communities in the composition of the households, their livelihoods activities and their economic level in 2009.

These differences, which existed before the project, have the potential to bias any comparison of the project's outcomes between the project and comparison communities. It was therefore important to control for these baseline differences when making such comparisons. As described in Section 3, the main approach used in this Effectiveness Review to control for the baseline differences was propensity-score matching (PSM). The full details of the matching procedure applied are described in Appendix 3. After matching, households in the project and comparison communities were reasonably well-balanced in terms of the recalled baseline data, with few significant differences between them. However, unfortunately not all of the households interviewed in the project communities could be matched. In particular, 33 of the 150 'very poor' households in the project communities and four of the 152 'poor' households in the project communities could not be matched and were dropped from the analysis. The consequence of this is that the estimates of the project's impact presented in Section 5 are not based on a fully representative sample of households in the project communities, but exclude a non-random minority.

All the results described in Section 5 of the report were tested for robustness by estimating them with several alternative statistical models, including alternative PSM models and linear or probit regression models. Some of these alternative models were constructed using the same subset of households as were used to construct the main PSM model, while others were constructed using the full set of households interviewed. Where the alternative statistical models produce markedly different results from those shown in the tables in this section, this is discussed in Section 5, in the text or in footnotes.

It is important to recall, as highlighted in Section 3, that PSM and regression models can control only for the baseline differences between the households in project and comparison communities for which data was collected in the survey. If there are any 'unobserved' differences between the two groups – such as individuals' attitudes or motivation, differences in local leadership, or weather, or other contextual conditions – then these may bias the estimates of outcomes described in Section 5. The evaluation design and the selection of respondents were intended to minimise any potential for unobserved differences, but this possibility cannot be excluded and must be borne in mind when interpreting the results.

5 RESULTS

Statistics primer

The main body of this report is intended to be free from excessive technical jargon, with more detailed technical information being restricted to the footnotes and appendices. However, there are some statistical concepts that cannot be avoided in discussing the results.

Effect size

The size or magnitude of an effect when evaluating outcomes refers to the size of the difference between groups. In this report, results will usually be stated as the average difference between the households supported by the project activities (that is, the 'intervention group') and the matched households in the communities where the project was not implemented (the 'comparison group').

Statistical significance

When we use the word 'impact' in this report, we are referring to differences between the households supported by the project activities and the corresponding households in the comparison communities that are *statistically significant*. Imagine that we find that the average project participant household owns four goats at the time of the survey. This would appear to be a large difference between the project participants and comparison households, given that the average comparison household owns only two goats. However, it is important to remember that this estimated average impact is derived from data on a *sample* of households, rather than data on the whole population. It is possible that, by chance, we happen to have interviewed project participant households who own unusually large numbers of goats, but that the ownership in the overall pool of project participant households is similar to that found among the comparison households.

For this reason, it is necessary to take into consideration the statistical probability of finding a difference in ownership of two goats, if there were, in reality, no difference between the project participant households and comparison households and in the number of goats owned. This probability is usually referred to as the *p*-value. *p*-values help to evaluate study hypotheses. The default hypothesis is always that there are no differences between the intervention and comparison groups. When a difference is detected, the *p*-value is used to evaluate whether the default hypothesis (that there is no difference between the intervention and comparison groups) should be rejected – that is, to conclude that the project had an impact. If the *p*-value is small, for instance one per cent, this means that there is a probability of only one per cent that our sample would show project participant households owning an average of two additional goats compared to comparison households when the true difference was zero. This is a small probability, and so we would have confidence in rejecting the default hypothesis that the project had no impact on the ownership of goats. We would then say that the result is 'statistically significant'. Note that the larger the sample size and the smaller the variation in the outcome measures among the sampled households, the smaller the *p*-value will be, and hence the more likely we are to be able to conclude that a result is statistically significant.

In the tables of results on the following pages, statistical significance will be indicated with asterisks, with three asterisks (***) indicating a *p*-value of less than one per cent, two asterisks (**) indicating a *p*-value of less than five per cent and one asterisks (*) indicating a *p*-value of less than 10 per cent. The higher the *p*-value, the less confident we are that the measured estimate reflects the true impact. Results with a *p*-value of more than 10 per cent are usually not considered to be statistically significant.

5.1 INTRODUCTION

This section presents a comparison of the households interviewed in project and comparison communities in terms of various outcome measures relating to the project. In the tables of results, asterisks are used to indicate where the differences are statistically significant at least at the 10 per cent significance level.

The results are shown after correcting for apparent baseline differences between the households interviewed in the project communities (the 'intervention' group) and in the comparison communities using a propensity-score matching (PSM) procedure. The details of this procedure are discussed in Appendix 3. All outcomes have also been tested for robustness with alternative statistical models. Where those alternative models produce markedly different results from those shown in the tables in this section, this is discussed in the text or in footnotes.

Three further points that were discussed in Section 4 should be recalled when interpreting the results presented in this section. Firstly, a minority of households surveyed in the project communities (33 of the 150 'very poor' households in the project communities and four of the 152 'poor' households in the project communities) were excluded from the analysis during the matching process. This means that the results shown in the tables in this section are not based on a fully representative sample of the direct project participants. However, some of the alternative statistical models used (and discussed in the text or in footnotes where appropriate) do include the full set of households interviewed in the project communities. Finally, the statistical estimation procedures used to derive estimates of outcomes are based only on 'observable' baseline characteristics. If there are any 'non-observable' differences between the households surveyed in project and comparison communities – such as individuals' attitudes or motivation, differences in local leadership, or weather, or other contextual conditions – then these may affect the estimates of outcomes. The evaluation design and the selection of respondents were intended to minimise any potential for unobserved differences, but this possibility cannot be excluded and must be borne in mind when interpreting the results.

5.2 SUPPORT RECEIVED AND INVOLVEMENT IN PROJECT ACTIVITIES

The first step in understanding what impact this project has had is to examine the extent to which respondents reported that they have received the types of support and participated in the various activities implemented under the project.

Table 5.1 shows the differences between the proportions of respondents interviewed in the project and comparison communities in terms of support received by their households since 2009. It can be seen in column 1 of the table that 87 per cent of the 'very poor' households reported having received cash transfers from an organisation since 2009. It is known, in fact, that *all* of these households received such transfers under the project: presumably there was some error in recall or some reluctance to answer this question on the part of a minority of respondents. In follow-up questions, almost all confirmed that they had received three transfers per year, and that the cash was given to a female household member rather than a male. When asked for how many years they had received a cash transfer, the majority of the recipients reported having only one year, even among those who are recorded as having received cash in both 2012 and 2013. Again, this is likely the result of recall error. Even in Fakola

commune, where it is thought that some of the cash transfer recipients were supported under the Food Facility project in 2011 and 2012, most respondents reported having received only one or two transfers since 2009. Unfortunately this means that those who were supported by the Food Facility project cannot be identified in the dataset, so no assessment can be made of the additional impact of participating in both projects, rather than in PASA 5 alone.

Cash transfer recipients were also asked about what they used the transfers for. In line with the objectives of the project, most respondents reported using their cash transfers to buy food or agricultural inputs. For example, approximately two thirds said that purchasing food was one of the top two uses to which they put their transfer, and approximately half said the same about agricultural inputs. Nearly a third reported that they used their transfers to buy livestock. It will also be noted in column 1 of Table 5.1 that 13 per cent of the 'poor' households in project communities reported having received cash transfers. It is not thought that any households were, in fact, designated as both 'very poor' (and so received cash transfers) and 'poor'. It is more likely that this figure is a result of recall error or confusion with other forms of support received.²

Table 5.1: Proportion of households having received support since 2009

	1	2	3	4	5
	Received cash transfer from an organisation %	Received cash shared by another household that received cash from an organisation %	Received donations of seeds %	Received donations of other agricultural inputs %	Allocated a plot developed for market gardening %
Overall					
Intervention group mean:	34.4	15.8	72.3	69.6	40.1
Comparison group mean:	0.95	0.0	3.0	4.35	8.9
Difference:	33.5*** (3.0)	15.8*** (2.3)	69.3*** (3.0)	65.3*** (3.2)	31.2*** (4.0)
Observations (intervention group):	265	265	265	265	265
Observations (total):	699	699	699	699	699
'Very poor' households					
Intervention group mean:	87.2	17.9	14.5	12.0	27.4
Comparison group mean:	2.9	0.0	1.4	3.8	10.1
Difference:	84.3*** (3.5)	17.9*** (3.2)	13.2*** (3.3)	8.18** (3.6)	17.3*** (5.9)
Observations (intervention group):	117	117	117	117	117
Observations (total):	330	330	330	330	330
'Poor' households					
Intervention group mean:	12.8	14.9	95.9	93.2	45.3
Comparison group mean:	0.15	0.0	3.7	4.6	8.4
Difference:	12.7*** (2.6)	14.9*** (2.7)	92.3*** (2.4)	88.7*** (2.8)	36.9*** (4.4)
Observations (intervention group):	148	148	148	148	148
Observations (total):	369	369	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

One concern with the evaluation design adopted for this Effectiveness Review was that cash transfer recipients are thought often to share the cash they receive with other households. If some of those in the comparison communities had benefited from the direct project participants sharing cash transfers with them, then estimates of the impact of these transfers would be underestimated. This was tested by asking respondents whether anybody outside the household had shared with them any cash transfers received since 2009. Approximately 16 per cent of those in the project communities responded positively – providing evidence of some sharing of the transfers within communities. On the other hand, no respondents in the comparison communities reported having benefited from the sharing of any transfers. This gives us some confidence that the comparison households are appropriate for evaluating the impact of the interventions carried out.

Columns 3 and 4 of the table show the proportions of respondents who reported having received donations of seeds and other agricultural inputs since 2009. As expected, almost all of the ‘poor’ households in the project communities responded positively, and only minorities of the ‘very poor’ households and of the households in comparison communities. Column 5 of Table 5.1 shows the proportions who reported that they or their household had been allocated a plot developed for kitchen gardening, again since 2009. Overall, 40 per cent of the households in project communities responded positively, against only nine per cent in comparison communities. In the project communities, the ‘poor’ households seem more likely to have been allocated a plot than the ‘very poor’ households. It should be recalled from Section 2 that the development of kitchen garden plots was carried out only in nine of the 40 communities included in this project (and specifically, in six of the 19 project communities included in the survey). Unexpectedly, approximately a third of households even in the project communities, where the kitchen gardens intervention was *not* carried out, reported that they had been granted a plot since 2009. It is possible that this represents the effect of some previous work by the partners in developing kitchen gardens, prior to the launch of the PASA 5 project.³

Of course, the project did not only provide direct support in the form of cash, inputs or plots, but also supported community members with various types of training and capacity building. Table 5.2 shows the proportions of respondents who reported that members of their household participated in each of these types of training since 2009. Note that respondents were asked only about whether there was any participation and about whether men or women participated – further details about the number of training sessions or the content of the training were not asked.

It can immediately be seen that significantly higher proportions of those interviewed in the project communities reported having received training in the production of staple crops or kitchen garden production, in agricultural processing, and in the management of food stocks. There was no indication of a difference between the project and comparison communities in terms of the number who had received training in nutrition in general or in the production of infant formula in particular; many of those in the comparison communities said that such training had been provided by local community health centres (known in Mali as CCom). On the other hand, the proportions that had received training in household financial management were clearly higher in the project communities. Only 15 per cent of those in the project communities were aware of having participated in a Reflect session – although again, there is a clear difference between the intervention and comparison communities.⁴

It should be reiterated that the figures shown in Table 5.2 represent the proportions engaged in each type of training only among the households directly supported by the project, in the ‘very poor’ or ‘poor’ groups. Since many of the forms of training supplied were targeted at the rest of the community, it is possible that participation in the community as a whole may have been significantly different from the situation presented by these figures.

Table 5.2: Proportion of households having received training since 2009

	1	2	3	4	5	6	7	8
	Training on production of staple crops %	Training on production from a kitchen garden %	Training on processing of agricultural products %	Training on management of food stocks %	Training on nutrition %	Training on production of infant formula %	Training on household financial management %	Training on community mobilisation (Reflect) %
Overall								
Intervention group mean:	40.6	41.4	22.0	31.9	51.7	40.2	27.6	15.0
Comparison group mean:	21.8	23.4	10.1	9.0	44.2	35.8	12.2	6.2
Difference:	18.7*** (4.6)	18.0*** (4.7)	12.0*** (3.6)	22.9*** (4.0)	7.6 (5.2)	4.4 (5.0)	15.4*** (4.15)	8.6*** (3.0)
Observations (intervention group):	265	265	265	265	265	265	265	265
Observations (total):	699	699	699	699	699	699	699	699
'Very poor' households								
Intervention group mean:	29.1	40.2	21.4	27.4	44.4	39.3	23.9	15.0
Comparison group mean:	18.1	22.8	7.25	6.92	48.0	46.0	8.6	4.8
Difference:	11.0* (5.6)	17.4*** (6.6)	14.1*** (4.6)	20.4*** (4.6)	-3.55 (7.5)	-6.7 (8.45)	15.4*** (4.5)	9.7*** (3.6)
Observations (intervention group):	117	117	117	117	117	117	117	117
Observations (total):	330	330	330	330	330	330	330	330
'Poor' households								
Intervention group mean:	45.3	41.9	22.3	33.8	54.7	40.5	29.1	15.0
Comparison group mean:	23.4	23.6	11.2	9.81	42.6	31.5	13.7	6.8
Difference:	21.9*** (5.6)	18.3*** (5.2)	11.1** (4.6)	24.0*** (5.1)	12.1** (6.0)	9.0 (6.0)	15.4*** (5.35)	8.1** (3.5)
Observations (intervention group):	148	148	148	148	148	148	148	148
Observations (total):	369	369	369	369	369	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

5.3 AGRICULTURAL ACTIVITIES

We now turn to examining the evidence for changes brought by this project in the agricultural activities of households supported by the project. A major emphasis of the project was in supporting the agricultural production of households. The cash transfer was explicitly intended (at least at the first stage) for investment in agriculture, and, as noted in Section 5.2, a majority of recipients reported that was how they did, in fact, use their transfers. Households in the 'poor' group were supported more directly in agricultural production.

We will begin by examining the effect of the project activities on the production of staple crops: maize, rice, sorghum, fonio, beans, and millet. Ninety-eight per cent of households interviewed farmed some staple crops during the 2013 agricultural season, and most farmed two, three or four of these crops.

Table 5.3 shows outcomes related to the farming of these staple crops. Column 1 shows that the 'very poor' households cultivated approximately 2.8 hectares of land on average, while the 'poor' households cultivated 3.3 hectares on average. There was no indication of a difference in the area of land cultivated between the project and comparison communities. Households on average had increased the area of land they were cultivating since 2009, but this increase did not differ between households in the project and comparison communities.

Where a clear difference is visible between households in the project and comparison communities is in the proportions using improved seeds, as shown in column 2 of the table. This is not surprising, at least among the 'poor' households, since many of them were given donations of improved seeds under this project in 2012 or 2013. Only a minority (36 per cent) of the 'poor' households who were supported by the project during 2012 continued to use improved seeds (presumably on their own initiative, using their own funds) in 2013. (In contrast, 66 per cent of the 'poor' households who were supported by the project in 2013 reported having used improved seeds that year.) However, that still represents a considerably higher proportion than among in the comparison communities – which perhaps implies that the project has had some success in encouraging greater adoption of improved seeds. The fact that a quarter of the 'very poor' households in the project communities also used improved seeds may reflect that, as mentioned during the focus groups, some of those who had received improved seeds under the project shared them with neighbours.

Column 3 of Table 5.3 shows that there is no difference between the proportions in the project and comparison communities who used chemical fertiliser in 2013, although adoption is anyway high. (The questionnaire did not ask about the quantities of fertiliser used.) On the other hand, there is some reasonably good evidence that the project had an effect on the numbers of 'poor' households using organic fertiliser (although there is no such evidence among the 'very poor' households).⁵

Column 5 of Table 5.3 show the estimated quantity of total production of staple crops during 2013. On average, households reported harvesting 2,700 kg of staple crops in 2013. There is no indication of a difference between the households in project and comparison communities.⁶ In fact, there is not even any significant difference between the production of 'poor' and 'very poor' households.

Table 5.3: Households' production of staple crops

	1	2	3	4	5
	Area of land cultivated in 2013 (hectares)	Households using any improved seeds in 2013 %	Households using chemical fertiliser in 2013 %	Household using organic fertiliser in 2013 %	Total production of staple crops in 2013 (kg)
Overall					
Intervention group mean:	3.13	44.1	80.8	62.9	2687
Comparison group mean:	3.13	8.35	82.5	54.1	2646
Difference:	-0.00 (0.22)	35.8*** (3.9)	-1.7 (3.9)	8.8* (5.1)	40 (314)
Observations (intervention group):	265	265	265	265	265
Observations (total):	699	699	699	699	699
'Very poor' households					
Intervention group mean:	2.68	26.5	73.5	58.1	3015
Comparison group mean:	2.86	6.05	82.7	51.9	2171
Difference:	-0.18 (0.34)	20.4*** (4.22)	-9.2 (6.8)	6.2 (7.5)	844 (724)
Observations (intervention group):	117	117	117	117	117
Observations (total):	330	330	330	330	330
'Poor' households					
Intervention group mean:	3.31	51.4	83.8	64.9	2552
Comparison group mean:	3.24	9.3	82.4	55.0	2841
Difference:	0.07 (0.23)	42.1*** (4.5)	1.4 (4.7)	9.9* (5.8)	-288 (295)
Observations (intervention group):	148	148	148	148	148
Observations (total):	369	369	368	368	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

An important initiative carried out under this project was the promotion of kitchen gardening. We have seen in Section 5.2 that approximately 40 per cent of the project participants reported having been provided with a plot specifically developed for kitchen gardening, including both 'very poor' and 'poor' households. Table 5.4 examines outcomes related to kitchen gardening and the diversity of agricultural production overall.

The first two columns of Table 5.4 show the proportions of households engaged in kitchen gardening, and the average proportion of related outcomes. It appears from the table that there are no significant differences between households in the project and comparison communities. However, it should be recalled that the table displays results averaged across all the communities, while the kitchen gardens initiative was carried out in only a minority of communities (specifically, in six of the 19 project communities in which the Effectiveness Review was carried out). When examining the results from the relevant communities, it is clear that there is a large and significant effect on the adoption of kitchen gardening. In the communities in which the kitchen garden intervention was carried out, 67 per cent of the households interviewed were producing from a kitchen garden, compared to only 39 per cent in the other project communities. The households in those six communities were cultivating an average of 6.7 *planches*

(a standard unit of measurement for kitchen gardens in the region), against just 3.9 *planches* in the other project communities. However, among those who are engaging in kitchen gardening, there was no evidence of an effect from the project on the time it took them to fetch water, nor on the number of months that water was available.

Column 3 of Table 5.4 provides an indication of the diversity of households' agricultural production. Although the estimated differences shown in the table are mostly not statistically significant, those derived from alternative estimation procedures *are* statistically significant,⁷ so this can be taken as providing some evidence of an effect from the project. As would be expected, this result is concentrated among those in the communities with the kitchen garden intervention, who produced approximately 1.7 more crop types in 2013 than those in other project communities. It does not appear that there is any effect from the project on the diversity of agricultural production among those in the project communities without the market garden intervention.

Table 5.4: Households' engagement in kitchen gardening and overall crop production

	1	2	3	4
	Household engaged in kitchen gardening during previous 12 months %	Area of land on which kitchen gardening was carried out during previous 12 months (<i>planches</i>)	Number of crop types produced during the previous 12 months	Number of months household covered its food needs from own production, during the previous 12 months
Overall				
Intervention group mean:	51.3	5.15	7.6	8.7
Comparison group mean:	51.2	5.18	6.8	8.8
Difference:	0.11 (5.2)	-0.04 (0.84)	0.8* (0.4)	-0.1 (0.3)
Observations (intervention group):	265	265	265	265
Observations (total):	699	699	699	699
'Very poor' households				
Intervention group mean:	53.0	4.25	7.5	8.1
Comparison group mean:	47.2	5.06	6.6	8.0
Difference:	5.8 (7.8)	-0.82 (1.06)	0.9 (0.7)	0.1 (0.55)
Observations (intervention group):	117	117	117	117
Observations (total):	330	330	330	330
'Poor' households				
Intervention group mean:	50.7	5.51	7.6	9.0
Comparison group mean:	52.9	5.23	6.9	9.1
Difference:	-2.2 (5.9)	0.28 (0.96)	0.7 (0.45)	-0.15 (0.3)
Observations (intervention group):	148	148	148	145
Observations (total):	369	369	369	366

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

The right-hand column of Table 5.4 shows the results from a question in the survey that asked respondents how many months during the previous 12 months their household was able to cover its food needs from its own production. As can be seen, respondents in the 'very poor' group reported that their household could cover its needs for approximately eight of the previous 12 months, and households in the 'poor' group approximately nine. There was no indication of a difference in this respect between households in the project and comparison communities – even among those in the communities with the kitchen garden intervention. Of course this is quite an approximate measure, and it is not likely to be sensitive to any small changes in households' situations that have occurred. More details on households' food consumption will be examined in Section 5.5.

Table 5.5 shows outcomes relating to the sales of crops made by households during the 12 months prior to the survey. Overall, 58 per cent of 'very poor' households and 68 per cent of 'poor' households sold some crops during that time: it can be seen from the first column of the table that this proportion did not differ significantly between the project and comparison communities. Column 2 shows that households typically made sales of only one or two crop types. That is, although the project apparently had an effect on the diversity of crops *produced*, there is no indication of an effect on the range of crops being *sold* – even among those in the communities with the market gardening intervention.

A key indicator of households' vulnerability, and a factor determining their ability to generate income, is *when* during the year they are selling their crops. One of the explicit objectives of making the last of the three annual cash transfers at harvest time was that recipients would be able to use the transfer for consumption at that time – so avoiding the need to sell their crops until later in the year, when they could generate higher prices. To assess the success of this, respondents were asked at what time during the year they made sales of crops. As can be seen in column 3 of Table 5.5, around three quarters of respondents who had sold any crops said that they were able to delay making those sales, rather than selling the crops immediately after harvesting (or even while the crops were still in the field). A greater proportion of the 'very poor' households in the project communities than those in the comparison communities were able to delay their sales. The fact that no such effect is observed among the 'poor' households suggests that it was the cash transfer itself that made the difference, as intended. On the other hand it should be noted that only 11 per cent of the respondents reported that they were able to delay selling their crops until the subsequent lean season, a proportion that did not differ between the project and comparison communities.

Columns 4 and 5 of Table 5.5 show figures for the total revenue that households generated through crop sales during the year prior to the survey. While the average sales figure among the 'very poor' households does not differ significantly between the project and comparison communities, the 'poor' households in the project communities apparently generated approximately double the revenue of the corresponding households in the comparison communities. However, there are reasons for doubting that conclusion. A logarithmic transformation was carried out in order to reduce the influence on the average of any observations that have particularly high reported levels of sales. Using the logarithmic measure, the evidence for a significant difference between households in the project and comparison communities is much weaker, as can be seen in column 4 of the table.⁸ This would suggest that the results in column 3 are influenced by some households with unusually high levels of sales. It would anyway be surprising to find a large effect of the project on sales revenue, given that production of staple crops did not differ significantly between the project and comparison communities, that the kitchen garden intervention was carried out in only a minority of the project communities, and that the number of crop types being brought to market is generally quite low.

Table 5.5: Households' crop sales during the 12 months prior to the survey

	1	2	3	4	5
	Household sold any crops %	Number of crop types sold	Household sold crops some time after the main harvest season ^a %	Total value of crop sales (francs CFA)	Total value of crop sales (logarithm of francs CFA)
Overall					
Intervention group mean:	64.6	1.9	76.5	70 042	6.62
Comparison group mean:	65.8	2.0	67.9	40 008	6.28
Difference:	-1.2 (4.8)	-0.1 (0.2)	8.5 (6.3)	30 034** (12 936)	0.34 (0.52)
Observations (intervention group):	265	265	167	265	265
Observations (total):	699	699	399	699	699
'Very poor' households					
Intervention group mean:	60.7	1.8	83.6	41 014	5.95
Comparison group mean:	54.7	1.6	61.1	36 770	5.21
Difference:	6.0 (8.0)	0.2 (0.4)	21.4** (9.3)	4 244 (12 016)	0.73 (0.79)
Observations (intervention group):	117	117	67	117	117
Observations (total):	330	330	178	330	330
'Poor' households					
Intervention group mean:	66.2	1.9	74.0	81 920	6.89
Comparison group mean:	70.4	2.2	70.2	41 333	6.71
Difference:	-4.2 (5.3)	-0.2 (0.3)	3.0 (6.65)	40 588*** (15 448)	0.18 (0.61)
Observations (intervention group):	148	148	100	148	148
Observations (total):	369	369	221	369	369

^a Among households that sold any crops during the 12 months prior to the survey.

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

5.4 BORROWING AND DEBT

Another intended result of providing cash transfers is that they should allow vulnerable households to reduce their debt burden, or avoid going into debt altogether, especially during the lean season. In order to assess the project's effects on borrowing, respondents were asked for some basic information about their households' borrowing and repayment of debt over the 12 months prior to the survey. A summary of the resulting data is shown in Table 5.6.

Firstly, it can be seen that just under half of all households reported having taken out a loan during the 12 months prior to the survey. This proportion did not differ significantly between the 'very poor' households in the project communities and the corresponding households in the comparison communities. Unexpectedly, the proportion of the 'poor' project participants who took out a loan during that time was considerably (and significantly) smaller than among the corresponding households in comparison communities. The same pattern is observed in terms of the number of loans borrowed,

as shown in column 2 of the table. (Data on the size of loans borrowed were not collected in the survey.)

Table 5.6: Households' borrowing and repayment of debt during the 12 months prior to the survey

	1	2	3	4
	Household took out any loans %	Total number of loans taken out	Household made any reimbursements on loans %	Household sold assets or took another loan in order to make reimbursements %
Overall				
Intervention group mean:	41.7	0.82	37.2	5.1
Comparison group mean:	52.2	1.11	38.6	6.5
Difference:	-10.5 (5.2)	-0.29 (0.13)	-1.35 (5.1)	-1.35 (2.2)
Observations (intervention group):	265	264	264	265
Observations (total):	698	698	697	699
'Very poor' households				
Intervention group mean:	46.2	0.97	35.0	7.7
Comparison group mean:	46.6	1.04	34.6	5.4
Difference:	-0.5 (7.0)	-0.07 (0.20)	0.5 (6.35)	2.3 (3.4)
Observations (intervention group):	117	116	117	117
Observations (total):	329	329	330	330
'Poor' households				
Intervention group mean:	39.9	0.76	38.1	4.05
Comparison group mean:	54.4	1.14	40.2	6.9
Difference:	-14.6** (5.9)	-0.38** (0.16)	-2.15 (6.4)	-2.8 (2.65)
Observations (intervention group):	148	148	147	148
Observations (total):	369	369	367	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

Lower borrowing among the 'poor' households supported by the project would be expected if many of them were in the habit of borrowing to invest in agricultural inputs, and that those inputs being provided by the project, at least for one farming season, meant that they could reduce their need to borrow. However, this does not appear to be the case: the proportion of 'poor' households who said that they borrowed to invest in agricultural inputs (about 17 per cent of the total) was not significantly different between those in the project and comparison communities. In fact the lower borrowing among the 'poor' households in project communities appears to be connected to less positive uses of credit: they were considerably less likely than the comparison group to report that they had borrowed in order to buy food or pay medical expenses.⁹

Survey respondents were also asked whether they had made any repayments on loans during the 12 months prior to the survey. As can be seen in column 3 of Table 5.6, the proportions who had done so did not differ significantly between the project and comparison communities. As a follow-up question, respondents were asked *how* they

had paid any loan reimbursements during that period.¹⁰ Column 4 of the table shows the proportions who reported having used what would normally be considered as negative strategies to make loan repayments: either through selling assets or through taking out another loan. It can be seen that only small minorities of respondents reported using these strategies, and again there was no indication that this proportion was lower among those supported by the project.

5.5 LIVESTOCK OWNERSHIP AND SAVINGS

As mentioned in Section 5.2, the third most common use of the cash transfer reported by the recipients was to purchase livestock. Recipients may choose to invest in livestock both as a productive asset and as an illiquid form of saving.

The first column of Table 5.7 shows that 81 per cent of the 'very poor' households owned some livestock (cattle, sheep, goats or donkeys) at the time of the survey, against only 67 per cent of the comparison households, a difference that is statistically significant. This seems likely to represent the result of some of the cash transfer recipients investing in livestock.

On the other hand, the 'poor' households were significantly less likely to own any livestock at the time of the survey: 74 per cent owned livestock, compared to 87 per cent of the corresponding comparison households. This result would be consistent with the agricultural support provided to 'poor' households encouraging them to redirect their efforts and investments away from livestock and towards crop production. However, it should be recalled from Section 5.3 that no evidence was found of greater investment in crop production, other than through the adoption of improved seeds. Among neither the 'very poor' nor the 'poor' households were there any significant differences between project and comparison communities in the *number* of livestock owned.¹¹

A related outcome of interest is households' cash savings. Survey respondents were not asked directly about the level of savings held by themselves or other household members, but two of the survey questions provided information on this issue. Firstly, in the course of assessing their access to credit, respondents were asked whether they would be able to obtain or borrow the sum of 50,000 francs CFA (approximately US\$ 100) from various sources if they needed it for an investment. Six per cent of respondents said that they could raise such a sum from their household's own savings. Secondly, respondents were asked how they could finance medical treatment if a member of their household fell ill. Approximately 12 per cent of respondents said that they would be able to finance treatment from their own savings (or, in one case, from medical insurance).

Column 3 shows the proportion of households who responded that they could raise funds from their savings in *either* of the situations mentioned. This proportion is clearly higher among those in the project communities, in both the 'very poor' and the 'poor' groups. The result among the 'poor' households is also consistent with that found in Section 5.4, that 'poor' households supported by the project were less likely than comparison households to report using credit to purchase food or to pay for medical expenses. Baseline data would be needed to attribute these differences with certainty to the project activities, but the fact the households in the project and comparison communities appear to have had similar levels of wealth (in terms of ownership of livestock and other assets, and housing conditions) in 2009 does provide some confidence that this difference between them has arisen over the course of the project's lifetime.

Table 5.7: Households' livestock ownership and savings

	1	2	3
	Household owns any livestock (excluding poultry) %	Total number of animals owned (excluding poultry)	Household has a useful level of savings ^a %
Overall			
Intervention group mean:	76.3	5.66	19.1
Comparison group mean:	80.9	6.41	8.9
Difference:	-4.6 (4.3)	-0.75 (0.84)	10.3*** (3.1)
Observations (intervention group):	265	265	265
Observations (total):	699	699	699
'Very poor' households			
Intervention group mean:	81.2	5.35	17.9
Comparison group mean:	67.2	5.32	4.95
Difference:	14.0** (6.6)	0.03 (1.12)	13.0*** (3.7)
Observations (intervention group):	117	117	117
Observations (total):	330	330	330
'Poor' households			
Intervention group mean:	74.3	5.79	19.6
Comparison group mean:	86.6	6.85	10.5
Difference:	-12.2*** (4.5)	-1.06 (0.99)	9.1** (3.55)
Observations (intervention group):	148	148	148
Observations (total):	369	369	369

^a Respondent reports that the household could access 50,000 francs CFA from their savings if needed for investment, or that if a household member falls ill, they could finance the treatment either from savings or from medical insurance.

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

5.6 FOOD SECURITY AND DIETARY DIVERSITY

As evidenced by the title of this report, the primary aim of the project was to promote food security among vulnerable households. Two separate sections of the survey allow assessment of the project's impact on food security, food consumption and dietary diversity.

Firstly, survey respondents were asked a series of questions intended to identify whether their household has secure access to food throughout the year. These questions were based on common indicators of food security, adapted from the Household Food Insecurity Access Scale.¹² Respondents were asked how frequently they and other household members had experienced the following:

- Having to reduce the number of meals eaten in a day because there was not enough food.
- Having to go to sleep at night hungry because there was not enough food.
- Having to spend a whole day and night without eating because there was not enough food.

Respondents were asked about the incidence of these problems both during the seven days prior to the survey as well as during the previous lean season (from approximately May to August). In Table 5.8, results are shown only for the questions relating to the previous lean season, when – as expected – the incidence of food security problems was generally found to be higher. The incidence of problems experienced during the lean season is assumed to provide a good indication of the household’s ability to secure year-round food security. The questions were asked separately for children, and for female and male adults in the respondent’s household. In most cases (more than 90 per cent), the responses given were the same for men and women household members.¹³ In Table 5.8, therefore, information is shown only about adult women household members and about children.

Table 5.8: Indicators of food security

	1	2	3	4
	Food security score ^a (women in household)	Food security score ^{a,b} (children in household)	Severe food insecurity (women in household) %	Severe food insecurity ^b (children in household) %
Overall				
Intervention group mean:	8.36	8.39	13.4	11.7
Comparison group mean:	8.41	8.63	14.6	10.3
Difference:	-0.05 (0.13)	-0.23 (0.15)	-1.2 (3.6)	1.5 (4.1)
Observations (intervention group):	264	184	264	184
Observations (total):	698	480	698	480
'Very poor' households				
Intervention group mean:	8.44	8.43	12.8	10.1
Comparison group mean:	8.17	8.63	16.8	8.5
Difference:	0.26 (0.21)	-0.15 (0.21)	-3.95 (5.3)	0.8 (4.35)
Observations (intervention group):	117	79	117	79
Observations (total):	330	220	330	220
'Poor' households				
Intervention group mean:	8.33	8.38	13.6	12.4
Comparison group mean:	8.51	8.62	13.7	11.1
Difference:	-0.17 (0.16)	-0.24 (0.18)	-0.1 (4.3)	1.0 (5.6)
Observations (intervention group):	147	105	147	105
Observations (total):	368	260	368	260

^a On a scale from zero to nine. Higher values represent fewer food security problems.

^b Among households with children at the time of the survey.

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

Responses were ranked on a scale from zero (meaning that the problem was encountered every day during the previous lean season) to three (meaning that the problem was never experienced during the previous lean season). A food insecurity score was created (separately for women and for children) by adding together the rankings for incidence of each of the three food-security problems. The resulting scores range from zero to nine, with higher scores representing fewer difficulties and hence better food security. The results are shown in columns 1 and 2 of Table 5.8. Overall there is no indication of a difference between the households in the project and comparison communities. However, an interesting tentative result not shown in the

table is that among the ‘very poor’ households only, the women’s food security score seems to be higher among those who had been supported by the project in both 2012 and 2013 – but not among those who began receiving support in 2013. This would be consistent with two years of cash transfers resulting in a cumulative positive effect that is not present after one year of transfers. However, the statistical evidence for this is not conclusive.¹⁴ The survey questions were also used to generate an indicator of severe food insecurity – defined as during the past lean season having to go to for a whole day and night without eating at least once, or having to reduce the number of meals or go to sleep hungry often (at least four times per week) during that time. The results for this indicator are shown in columns 3 and 4 of Table 5.8. The incidence of severe food insecurity among women in ‘very poor’ households in the project communities was estimated to be considerably lower than among corresponding households in the comparison communities (13 per cent, compared to 17 per cent in the comparison communities). However, that difference is not clearly statistically significant, so it cannot be stated with confidence that this difference would be observed among the ‘very poor’ project participant households in general, rather than just in the particular sample interviewed. As well as applying these indicators of food security, respondents were asked to provide detailed information about all the food consumed in their household during the seven days prior to the survey. This involved asking, firstly, what types of food the household had consumed – from a list of 25 items – during those seven days.

Table 5.9: Households’ food consumption in the seven days prior to the survey

	1	2	3
	Number of food types consumed	Food consumption per adult equivalent per day (francs CFA)	Food consumption per adult equivalent per day (logarithm of francs CFA)
Overall			
Intervention group mean:	10.3	335.3	5.65
Comparison group mean:	9.2	321.6	5.58
Difference:	1.1*** (0.3)	13.6 (20.7)	0.07 (0.07)
Observations (intervention group):	265	265	265
Observations (total):	699	699	699
‘Very poor’ households			
Intervention group mean:	10.3	355.5	5.67
Comparison group mean:	9.1	294.1	5.53
Difference:	1.2*** (0.4)	61.4** (28.2)	0.15* (0.085)
Observations (intervention group):	117	117	117
Observations (total):	330	330	330
‘Poor’ households			
Intervention group mean:	10.3	327.0	5.64
Comparison group mean:	9.2	332.9	5.60
Difference:	1.0*** (0.4)	-5.9 (26.4)	0.04 (0.09)
Observations (intervention group):	148	148	148
Observations (total):	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the ‘very poor’ and ‘poor’ households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

In the first column of Table 5.9, households in the project and comparison communities are compared in terms of the range of food types they reported having eaten during the seven-day period. It can be immediately seen that the project participant households are consuming a wider range of food types than the comparison households. Among the ‘very poor’ households, that difference is mostly accounted for by those in the communities where the kitchen garden intervention was carried out; it is not clear whether there is a significant effect among ‘very poor’ households in other communities. However, among the ‘poor’ households, the increase in dietary diversity does not appear to be linked to the kitchen garden activities.

For each food type that had been consumed in the household, respondents were then asked to specify the *quantity* consumed over the seven-day period. This quantity was then converted into an approximate monetary value 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. An overall food consumption 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.¹⁵ This expenditure variable was then expressed on a logarithmic scale to reduce the influence on the overall result of any households with extreme values for total consumption. The comparison of expenditure between supported households and comparison households, both before and after logarithmic transformation, is shown in columns 2 and 3 of Table 5.9.

The data provide some evidence that food consumption was significantly higher among the ‘very poor’ households supported by the project communities than among the corresponding comparison households.¹⁶ The estimated difference in the logarithmic figure of 0.15 would imply that food consumption is approximately 16 per cent higher among the ‘very poor’ households in the project communities than among those in the comparison communities.¹⁷ (The indication provided by the food security indicators of a larger effect among those who had been supported by the PASA 5 project since 2012 is not supported by the detailed data on food consumption.) On the other hand, among the ‘poor’ households, there is no indication of a difference in terms of overall food consumption between those in the project and comparison communities.

5.7 HOUSEHOLD EXPENDITURE AND INDICATORS OF MATERIAL WEALTH

Apart from food consumption, several additional indicators of a household’s economic level were included in the questionnaire.

To start with, although full details of non-food expenditure were not collected, respondents were asked to estimate the total amount that their household had spent on children’s education and on health during the 12 months prior to the survey. As can be seen in Table 5.10, there is little indication of a difference between the households in the project and comparison communities in this respect. There is some evidence that expenditure on boys’ education was slightly higher among the ‘very poor’ households in the project communities than those in the comparison communities, but the opposite is the case for girls’ education. (The same is true after logarithmic transformation of each of the expenditure figures, and if figures on education expenditure are restricted to the 80 per cent of households that had school-aged children at the time of the survey.)

Comparison of columns 2 and 3 in Table 5.10 reveals a large disparity between expenditure on the education of girls and boys. The same pattern is visible in school

attendance. On average, 28 per cent of school-aged boys in households interviewed were said to have attended school over the past four weeks, compared to only 21 per cent among school-aged girls. These gender differentials in school attendance and expenditure were consistent between project and comparison communities.

Table 5.10: Households' expenditure on health and education during the 12 months prior to the survey

	1	2	3	4
	Expenditure on health (francs CFA)	Expenditure on education for girls (francs CFA)	Expenditure on education for boys (francs CFA)	Total expenditure on education (francs CFA)
Overall				
Intervention group mean:	23 740	2 321	3 394	5 715
Comparison group mean:	26 480	1 711	2 732	4 444
Difference:	-2 740 (2 853)	610 (848)	662 (734)	1 271 (1 150)
Observations (intervention group):	265	265	265	265
Observations (total):	698	698	698	698
'Very poor' households				
Intervention group mean:	19 935	1 128	2 804	3 932
Comparison group mean:	24 201	2 272	1 286	3 558
Difference:	-4 267 (3 605)	-1 144 (766)	1 518* (852)	374 (1 408)
Observations (intervention group):	117	117	117	117
Observations (total):	330	330	330	330
'Poor' households				
Intervention group mean:	25 297	2 809	3 636	6 444
Comparison group mean:	27 413	1 481	3 325	4 807
Difference:	-2 108 (3 553)	1 328 (1 140)	311 (956)	1 640 (1 437)
Observations (intervention group):	148	148	148	148
Observations (total):	368	368	368	368

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

To provide an overall indication of each household's economic situation, a household wealth index was created. Respondents were asked to provide information about their household's ownership of various assets (including livestock, productive equipment and household goods), as well as about the conditions of the family's house, both in 2009 and at the time of the survey.

If each of those assets and housing characteristics are indicators of household wealth, they should be correlated with each other. That is, a household that scores favourably on one particular wealth indicator should be more likely to do so for other wealth indicators. A small number of items that had low correlations with the others were therefore not considered to be good wealth indicators and so were excluded from the index.¹⁸

A data reduction technique called principal component analysis (PCA) was used to produce two indices of overall wealth, one based on the recalled data from 2009, and one based on the household's situation at the time of the survey. PCA produces a measure that maximises the variation in asset types by assigning more weight to those

assets that are most highly correlated with the inter-item variation. Hence, each household's weighted index score is determined by both the number of assets it owns, and by the weight assigned to each asset type. The resulting index enables the relative wealth status of the households to be compared. The wealth index for 2009 is the measure that has been used throughout this analysis to control (to the greatest extent possible) for baseline differences in wealth status among the households of the various treatment groups.

After calculating the wealth index for both 2009 and the date of the survey, households were categorised according to the quintile in which they lie – that is, the top 20 per cent of households according to wealth indicators were categorised together, as were those in the next 20 per cent, and so on. The measure reported in Table 5.11 is based on

Table 5.11: Change in index of wealth indicators

	Number of quintiles of wealth index in which household increased
Overall	
Intervention group mean:	0.14
Comparison group mean:	0.12
Difference:	0.03 (0.12)
Observations (intervention group):	265
Observations (total):	699
'Very poor' households	
Intervention group mean:	0.04
Comparison group mean:	-0.03
Difference:	0.07 (0.12)
Observations (intervention group):	117
Observations (total):	330
'Poor' households	
Intervention group mean:	0.18
Comparison group mean:	0.18
Difference:	0.01 (0.15)
Observations (intervention group):	148
Observations (total):	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

households moving between quintiles. For example, a household that changed from being among the bottom 20 per cent of the sample in 2009 to being in the 20–40 per cent quintile at the time of the survey would be given a score of +1. A household that moved from the middle quintile to the bottom quintile would have a score of –2.

The results in Table 5.11 show little difference between the project and comparison communities in terms of the change in wealth indicators since 2009. However, the project participants in the villages where the kitchen garden intervention was carried out (both among the 'very poor' and 'poor' groups) do appear to have increased in terms of this wealth index at a greater rate than the comparison households. It is not clear why this positive effect should be restricted to those in the communities with the kitchen garden intervention. This is strange given that those households were not found earlier to be generating any higher revenue from agricultural sales than were households in comparison communities.

5.8 COPING STRATEGIES ADOPTED

We will now investigate to what extent the project has built the resilience of the ‘very poor’ and ‘poor’ households – that is, the extent to which the project has enabled participants to manage risks and deal with shocks, stresses and uncertainty. This section will investigate households’ actual experience of dealing with shocks and stresses, while the next section will construct an estimate of households’ ability to cope with shocks and stresses in the future.

One section of the survey asked respondents whether their household had adopted any specific strategies to cope during the lean season of 2013. The coping strategies mentioned were:

- Receiving money transfers from relatives outside the community.
- Engaging in seasonal migration.
- Engaging in gold panning.
- Borrowing money or food at a high interest rate.
- Selling livestock in order to buy food.
- Selling productive assets or household goods in order to buy food.
- Cutting or selling wood.
- Removing one or more children from school.

For each of these coping strategies, if respondents reported that they had engaged in the strategy, they were then asked whether it is normal for them to engage in that strategy during the lean season each year, or whether it was an unusual strategy specifically adopted in 2013. It was considered that those households that had to adopt unusual coping strategies could be assumed to have particular difficulty in coping with the lean season that year.

The first column of Table 5.12 shows that the majority of households interviewed reported adopting some of the coping strategies during 2013. Both the proportion of households adopting some coping strategies and the average number of them adopted are significantly higher in the project communities than the comparison communities. That in itself is not necessarily a bad thing: some of the items on the list of coping strategies may represent positive ways to cope with the lean season. However, it is surprising that adoption of unusual strategies (which seem more likely to be negative) is higher among the project participants, as shown in columns 3 and 4 of the table. If the greater adoption of unusual coping strategies really does imply households being less able to cope, then this result seems to be at odds with some of the apparent improvements in dietary diversity, food consumption and material wealth found in Sections 5.6 and 5.7, as well as with information received during the focus group discussions. One possible explanation is that the project participants felt more comfortable admitting to taking some of the more negative coping strategies in 2013 than did the comparison respondents.

Table 5.12: Coping strategies adopted during the lean season of 2013

	1	2	3	4
	Households adopting any of the coping strategies listed in 2013 %	Number of coping strategies listed adopted in 2013	Households adopting any coping strategy in 2013 that is not normally adopted by the household %	Number of coping strategies adopted in 2013 that are not normally adopted by the household
Overall				
Intervention group mean:	73.8	1.45	44.8	0.60
Comparison group mean:	63.9	1.12	31.6	0.41
Difference:	9.9** (4.9)	0.33*** (0.12)	13.2*** (5.1)	0.19** (0.08)
Observations (intervention group):	265	265	265	265
Observations (total):	699	699	699	699
'Very poor' households				
Intervention group mean:	69.2	1.28	45.3	0.58
Comparison group mean:	67.6	1.11	24.7	0.25
Difference:	1.6 (7.1)	0.17 (0.16)	20.6*** (7.2)	0.33*** (0.085)
Observations (intervention group):	117	117	117	117
Observations (total):	330	330	330	330
'Poor' households				
Intervention group mean:	75.7	1.52	44.6	0.60
Comparison group mean:	62.4	1.13	34.5	0.47
Difference:	13.3** (5.99)	0.39** (0.16)	10.1* (6.06)	0.13 (0.094)
Observations (intervention group):	148	148	148	148
Observations (total):	369	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

5.9 INDICATORS OF RESILIENCE

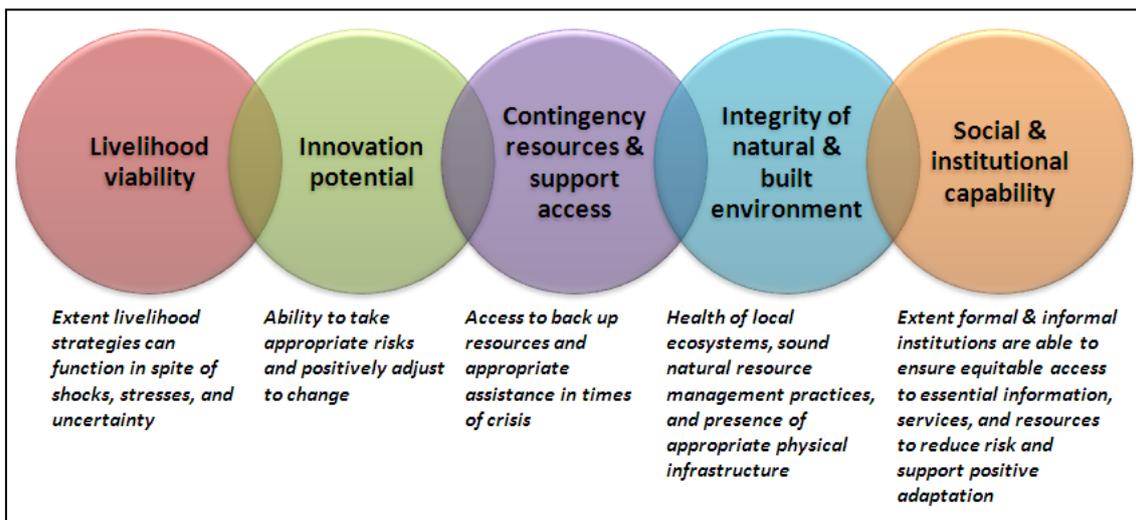
The project under review was specifically aimed at increasing households' resilience to crises. As part of Oxfam GB's Global Performance Framework, an innovative approach has been developed to measuring the resilience of households to shocks and stress and their ability to adapt to change.¹⁹ This approach involves capturing data on various household and community characteristics falling under the five interrelated dimensions presented in Figure 5.1.

One reason why measuring concepts such as resilience and adaptive capacity is challenging is that we can only really assess whether a system has successfully coped or adapted after the fact. In other words, we would have to wait until after a crisis has struck in order to assess the effectiveness of the intervention in question. Section 5.8 provided some indication of how households were able to cope with the lean season of 2013, but that cannot provide a full assessment of the impact of the project on households' resilience. One reason is that these events occurred while people were

being directly supported by the PASA 5 project: the cash transfers, agricultural support, and other activities may have assisted households in dealing with those crises in a way that does not reflect a sustained improvement in their capabilities. In that sense, a full assessment of the resilience created at the household and community level through this project could only be made based on households' response to crises and stresses that occur after implementation ends.

The characteristic approach to resilience measurement is based on the assumption that there are particular characteristics of households and communities that affect how well they are able to cope with shocks and they positively adapt to change. A limitation, of course, is that we do not know for certain how relevant these characteristics actually are; rather, we assume they are important based on common sense, theory, and an understanding of the local context.

Figure 5.1: Dimensions affecting the ability of households and communities to minimise risks from shocks and adapt to emerging trends and uncertainty



The characteristics that inform the overall measure of resilience fall under the five dimensions presented in Figure 5.1. First, if we think about what a household would need in order to cope with current and future shocks, stresses, and uncertainty, a **viable livelihood** is likely to be one of them. For instance, 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 less likely to be resilient than their relatively more wealthy 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 focuses 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 will likely 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, and emergency services – 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 and adjust to climatic shocks/change than those that are relatively 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 of shocks and stress, the livelihoods and/or health of community members can be negatively affected.

In most, if not all cases, it is necessary to look beyond the household level when examining resilience and adaptive capacity. Indeed, it is reasonable to assume that households are likely to be better able to successfully adjust to climatic shocks/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.

There is no one generic set of ‘resilience’ characteristics that are applicable to all contexts. Given this, efforts were made to specify characteristics relevant to the specific risks faced in the area where the survey was carried out. The characteristics identified are listed in Table 5.13. It is important to note at this stage that while not all characteristics considered in this Effectiveness Review may be directly linked to the project activities, all are deemed to be important to a household’s overall resilience in this particular context. The right-hand column of Table 5.13 shows whether or not the project could be expected to have a positive impact on each of the characteristics listed.

Table 5.13: Characteristics of resilience examined in this Effectiveness Review

Dimension	Characteristic	Connected to project logic?
Livelihood viability	Ownership of productive assets	Yes
	Crop diversification	Yes
	Ownership of livestock	Yes
	Livelihood diversification	No
	Use of improved seeds	Yes
	Use of soil conservation techniques	Yes
Innovation potential	Attitudes towards changing practices	No
	Access to credit	No
Access to contingency resources and support	Savings	Yes
	Social support networks	No
	Access to a grain bank	No
Integrity of the natural and built environment	Access to safe drinking water	No
	Access to irrigation	Yes
Social and institutional capability	Participation in community groups	No
	Social cohesion in the community	No
	Confidence in government structures to deal with crises	No

In the pages that follow, we will consider how project participants differ from comparison households in each of the resilience characteristics listed in Table 5.13. Firstly, however, we examine how all of the characteristics combine to provide an overall measure of resilience. The indices of resilience were constructed using an approach known as the Alkire-Foster method, adapted from that used by the Oxford Poverty and Human Development Institute for measuring multidimensional constructs, such as poverty and women's empowerment.

The questionnaire used in the Effectiveness Review included questions relating to each of the characteristics listed in Table 5.13. Indeed, several of these indicators have already been discussed in earlier sections of this report. For each characteristic, a benchmark was defined, based on what it means for a household to be faring reasonably well in relation to the characteristic in question. The particular benchmarks used for each characteristic are detailed in Appendix 1. For example, each household was defined as scoring positively in terms of crop diversification if the household farmed at least three different types of staple crops in 2013, as well as at least three other types of crops. There is inevitably a degree of arbitrariness in defining such cut-offs. In many cases, alternative cut-offs and alternative formulations of the indicators were tested, as a check on the robustness of the results obtained from applying the cut-offs.

A measure of overall resilience was then derived by counting the proportion of characteristics in which the household scored positively. We refer to this measure as the *base resilience index*. A household was then defined as having positive resilience overall if it scored positively in at least two thirds of the characteristics. A second resilience index was then created, which takes a value of 1 if the household reaches that benchmark for overall resilience and otherwise is equal to the proportion of characteristics in which the household scored positively. This modified index is known as the *Alkire-Foster resilience index*.²⁰ In fact in this case, only small minorities of households met the threshold for overall positive resilience (three per cent of the 'very poor' households, and seven per cent of the 'poor' households), so the Alkire-Foster index is little different from the base resilience index.

The Oxfam GB global indicator for resilience is based on whether each household is doing better in terms of overall resilience than a 'typical' household in the area. This is defined by comparing each household's resilience index with the median of the comparison group. In particular, the global indicator takes the value of 1 if the resilience index is greater than the median of the comparison group and zero otherwise.

Table 5.11 presents the differences between the households surveyed in the project and comparison communities in terms of each of these three measures of overall resilience. These figures provide little indication of a difference between households in the project and comparison communities. The alternative statistical models tested do provide some evidence that the resilience index is higher among 'very poor' households in project communities than in comparison communities²¹ – an effect that also appears when comparing these households in terms of the global indicator, in column 3. But there is no evidence provided by any of the tests for a difference in overall resilience among the 'poor' households.

Clearly for interpreting these results, it is important to examine the effects of the project on the underlying indicators. Figure 5.2 shows a graphical comparison of the households in project and comparison communities in terms of each of the indicators of resilience. Tables 5.15 and 5.16 present the same results with the statistically significant differences identified. (Again, the particular definitions used to derive each indicator are detailed in Appendix 1.)

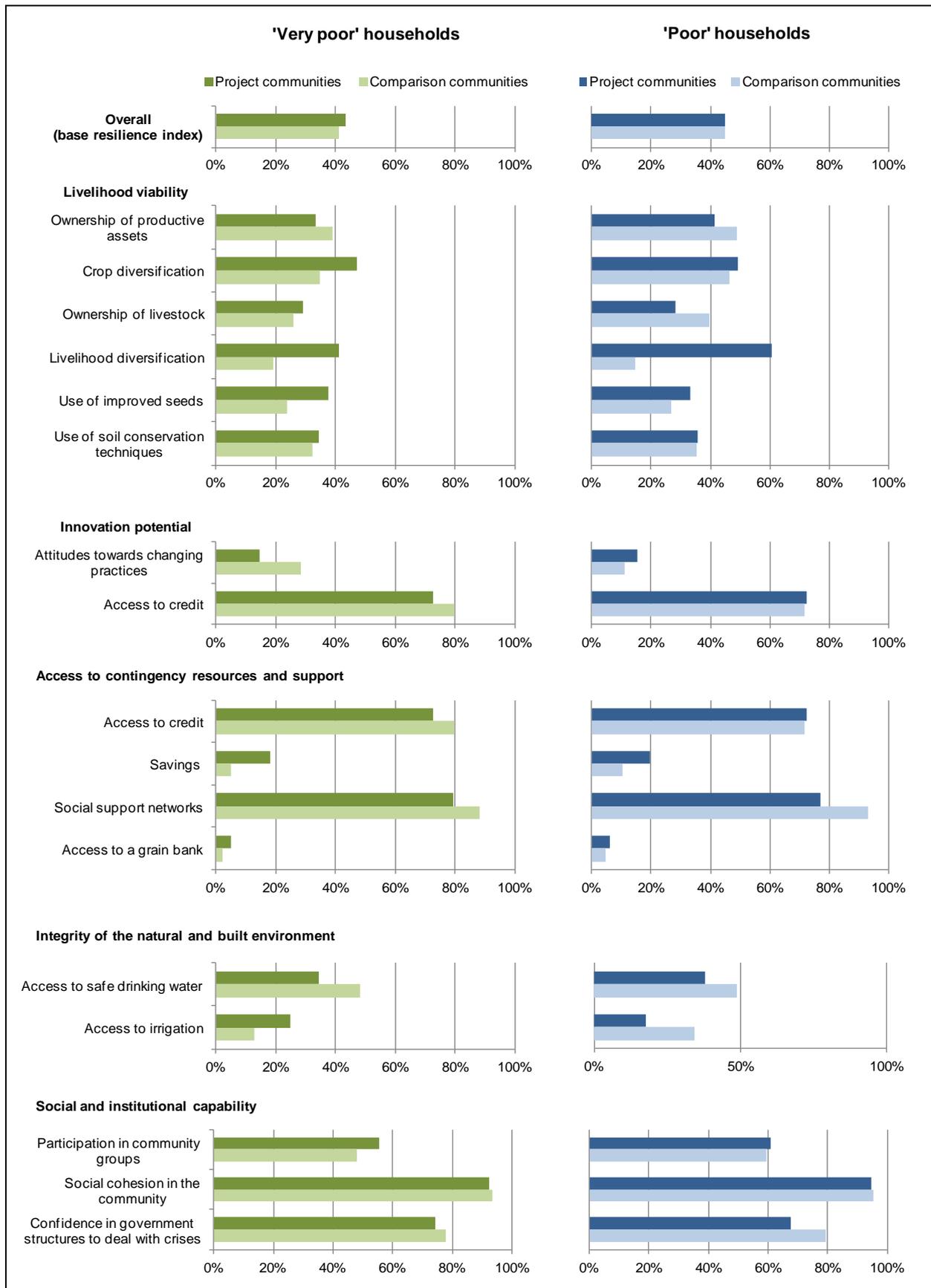
Table 5.14: Aggregate measures of resilience

	1	2	3
	Base resilience index	Alkire-Foster resilience index	Oxfam GB global indicator for adaptation and risk reduction %
Overall			
Intervention group mean:	0.44	0.66	49.0
Comparison group mean:	0.44	0.65	45.4
Difference:	0.00 (0.02)	0.01 (0.02)	3.7 (5.2)
Observations (intervention group):	265	265	265
Observations (total):	699	699	699
'Very poor' households			
Intervention group mean:	0.43	0.65	61.5
Comparison group mean:	0.41	0.61	47.5
Difference:	0.02 (0.02)	0.03 (0.03)	14.0* (7.6)
Observations (intervention group):	117	117	117
Observations (total):	330	330	330
'Poor' households			
Intervention group mean:	0.45	0.67	43.9
Comparison group mean:	0.45	0.67	44.5
Difference:	-0.00 (0.02)	0.00 (0.025)	-0.6 (6.1)
Observations (intervention group):	148	148	148
Observations (total):	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

The results for several of the indicators – or related measures – have already been discussed in earlier sections of the report. Consistent with the result found in Section 5.7, there is no indication of a difference between the households in project and comparison communities in terms of their ownership of productive assets. As discussed in Section 5.4, livestock ownership is in fact lower among 'poor' households in the project communities than the comparison communities. The diversity of crops produced by households is greater in the project communities, but this effect is restricted to communities where the kitchen garden intervention was implemented: there is no sign of an effect on crop diversification in the remainder of the project communities. The proportions using improved seeds are higher in the project communities, a result which is only partly due to the direct provision of seeds under the project. (As noted in Section 5.2, there appears to be an effect on adoption of improved seeds among those who were not given seeds during the year prior to the survey, and even among the 'very poor' households, who were not provided with improved seeds under the project at all.) One indicator not yet discussed is the use of soil conservation techniques, such as *zai*, *demi-lunes*, *cordons pierreux* and *haies vives*. Adoption of these techniques was higher in the project communities than the comparison communities – though it is not clear that the difference is statistically significant among the 'poor' households.

Figure 5.2: Results for indicators of resilience



Another outcome directly related to the project activities is access to irrigation for kitchen gardening. As discussed in Section 2, the development of plots to be used for kitchen gardening that was carried out under the project included the digging of wells for irrigation. To construct the indicator access to water for farming used in constructing the resilience index, households were scored positively if they had access to water for at least six months of the year, and that the source of water was within 30 minutes' round trip of the plot. The results, shown in Figure 5.2 and in column 5 of Table 5.16, are confusing: 'very poor' households in the communities with the kitchen garden intervention were more likely to meet these criteria, but the same did not seem to apply among the 'poor' households. Indeed, the 'poor' households in the project communities (and hence the overall sample) were less likely to have access to water for kitchen gardening than were corresponding households in project communities.

The difference between households interviewed in the project and comparison communities in terms of having savings has already been discussed in Section 5.4. The indicator for which results are shown in Figure 5.2 and in column 1 of Table 5.16 is the same as that examined previously (in Section 5.4). The proportion of households in the project communities who reported that they have significant levels of savings was approximately double that in comparison communities.

It will be seen in column 4 of Table 5.16 that smaller proportions of those in the project communities than in the comparison communities score positively in terms of access to drinking water. This indicator was defined to be positive for households whose main source of drinking water is a protected well, borehole, or piped water, and water has been available from this source every month during the past 12 months. There is little or no difference between the project and comparison communities in the types of water source used, but 28 per cent of those in the project communities said that water was not available from their main source throughout the year, compared to only 17 per cent in the comparison communities. However, this difference was also present in the data recalled from baseline in 2009, so it does not appear that this difference is connected to the project.

Four of the 16 indicators of resilience – attitudes towards innovation in livelihoods activities, the strength of social support networks, social cohesion in the community, and confidence in government structures to respond to crises – relied on asking respondents whether they agreed or disagreed with statements intended to elicit their attitudes or opinions on the matter in question. The specific statements presented to the respondents are detailed in Appendix 1. Unexpectedly, in each of these cases, the households interviewed in the project communities expressed views that were more negative than those of the corresponding households in the comparison communities, and in many cases those differences are statistically significant.

Table 5.15: Proportion of households scoring positively on characteristics of livelihood viability and innovation potential

	1	2	3	4	5	6	7	8
	Ownership of productive assets %	Crop diversification %	Ownership of livestock %	Livelihood diversification %	Use of improved seeds %	Use of soil conservation techniques %	Attitudes towards changing practices %	Access to credit %
Overall								
Intervention group mean:	38.9	48.7	28.6	35.3	55.1	34.4	15.2	72.4
Comparison group mean:	46.0	43.1	35.7	34.4	16.0	25.9	16.2	74.1
Difference:	38.9 (46.0)	48.7 (43.1)	28.6 (35.7)	35.3 (34.4)	55.1*** (16.0)	34.4* (25.9)	-0.9 (3.5)	-1.7 (4.6)
Observations (intervention group):	265	265	265	265	265	265	265	265
Observations (total):	699	699	699	699	699	699	699	699
'Very poor' households								
Intervention group mean:	33.3	47.0	29.1	34.2	41.0	37.6	14.5	72.6
Comparison group mean:	39.0	34.6	25.7	32.1	19.1	23.6	28.4	79.6
Difference:	-5.6 (7.45)	12.4* (7.3)	3.3 (6.1)	2.1 (7.1)	22.0*** (6.55)	14.0** (6.8)	-13.8* (7.1)	-7.0 (6.55)
Observations (intervention group):	117	117	117	117	117	117	117	117
Observations (total):	330	330	330	330	330	330	330	330
'Poor' households								
Intervention group mean:	41.2	49.3	28.4	35.8	60.8	33.1	15.5	72.3
Comparison group mean:	48.9	46.6	39.7	35.4	14.8	26.8	11.2	71.9
Difference:	-7.7 (6.0)	2.8 (6.1)	-11.3** (5.6)	0.4 (6.1)	46.0*** (5.45)	6.3 (5.4)	4.4 (3.45)	0.4 (5.5)
Observations (intervention group):	148	148	148	148	148	148	148	148
Observations (total):	369	369	369	369	369	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

Table 5.16: Proportion of households scoring positively on characteristics of access to contingency resources and support, integrity of the natural and built environment, and social and institutional capability

	1	2	3	4	5	6	7	8
	Savings %	Social support networks %	Access to a grain bank %	Access to safe drinking water %	Access to irrigation %	Participation in community groups %	Social cohesion in the community %	Confidence in government structures to deal with crises %
Overall								
Intervention group mean:	19.1	77.7	5.80	36.8	19.7	59.3	93.9	69.5
Comparison group mean:	8.9	91.5	3.94	48.5	28.0	56.0	94.7	78.9
Difference:	10.3*** (3.1)	-13.8*** (3.4)	1.9 (1.8)	-11.7** (5.1)	-8.3* (4.4)	3.3 (5.2)	-0.7 (2.2)	-9.4** (4.5)
Observations (intervention group):	265	265	265	265	265	265	265	265
Observations (total):	699	699	699	699	699	699	699	699
'Very poor' households								
Intervention group mean:	17.9	79.5	5.1	34.2	24.8	55.6	92.3	74.4
Comparison group mean:	4.95	88.1	2.0	48.1	12.9	47.8	93.3	77.6
Difference:	13.0*** (3.75)	-8.6 (5.6)	3.1* (1.9)	-13.9* (8.2)	11.9** (5.0)	7.7 (7.4)	-1.0 (3.5)	-3.3 (6.2)
Observations (intervention group):	117	117	117	117	117	117	117	117
Observations (total):	330	330	330	330	330	330	330	330
'Poor' households								
Intervention group mean:	19.6	77.0	6.1	37.8	17.6	60.8	94.6	67.6
Comparison group mean:	10.5	92.9	4.7	48.7	34.2	59.4	95.2	79.5
Difference:	9.1** (3.9)	-15.9*** (3.7)	1.35 (1.9)	-10.8* (5.9)	-16.6*** (4.7)	1.4 (5.8)	-0.6 (2.65)	-11.9** (5.3)
Observations (intervention group):	148	148	148	148	148	148	148	148
Observations (total):	369	369	369	369	369	369	369	369

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; Sampling weights are applied in overall figures. PSM estimates for the 'very poor' and 'poor' households are bootstrapped with 1,000 repetitions, with standard errors clustered by community.

6 CONCLUSIONS

6.1 CONCLUSIONS

This Effectiveness Review provides good evidence of impact from the various project activities on household livelihoods. In terms of households' agricultural activities, it is clear that those in the project communities were more likely to have used improved seeds during the last agricultural season, and that this was not restricted only to those who had received donations of improved seeds that year. There is also some evidence of greater use of organic fertiliser in the project communities. However, the area of land cultivated and the total production of staple crops, does not appear to have changed as a result of the project. Nor was there an indication of an effect on the number of months during which households were able to cover their food needs from their own production.

In communities where the PASA 5 project has supported the development of land for kitchen gardening, nearly two thirds of the households interviewed were engaged in kitchen gardening. Households in those communities had much larger kitchen garden plots and were producing a significantly larger range of crop types than those in the other project communities or in the comparison communities. However, it should be noted that on average they reported that water had been available for kitchen gardening during only six months of the year.

One apparent effect of the cash transfers is that the 'very poor' households who received them were able to delay making sales of their crops until some time after the harvest season had ended. There are also some indications that households in the project communities generating higher revenue from crop sales than those in the comparison communities, but the evidence for this is not conclusive.

Survey respondents were also asked for some basic information about their borrowing, saving, and ownership of livestock. A clear positive result is that households supported by the project in both the 'very poor' and 'poor' groups were much more likely to have a significant amount of savings at the time of the survey than were the comparison households. In addition, the 'poor' households supported by the project were less likely to have used credit: only 40 per cent reported having borrowed during the 12 months prior to the survey, against 45 per cent of the comparison group. In particular, they were less likely to report having borrowed in order to buy food or pay for medical expenses.

Some of those in the 'very poor' group reported having used their cash transfers to invest in livestock – and correspondingly, they were more likely to own livestock at the time of the survey than were the 'very poor' comparison households. On the other hand, the 'poor' households supported by the project were less likely to own livestock than the corresponding comparison households.

One of the most important outcomes to evaluate in this Effectiveness Review was the project's impact on food security. Some standard indicators of food security were included in the survey, but did not provide any clear evidence of an effect from the project. However, survey respondents were also asked to provide details about all the food consumed by their household during the seven days prior to the survey. The detailed data derived from these questions show that households interviewed in the project communities were consuming a wider range of food types than those in the comparison communities. Among the 'very poor' households, this effect on dietary

diversity is most clearly visible among those in the communities where the kitchen garden initiative was implemented – but it seems to be present among the wider population as well.

The food consumption data was also used to create an estimate of the total value of all food consumed in each household during the seven days prior to the survey. The results suggest that the 'very poor' households in the project communities were consuming significantly more food (approximately 16 per cent more, by value) than those in the comparison communities. This appears to represent a sustained effect of the cash transfers on household food consumption, several months after the last transfer was made.

On the other hand, there was no indication of any such difference in food consumption between the 'poor' households in the project and comparison communities. Neither did either the 'very poor' or 'poor' households appear to be spending more on health or education, nor have they shown increased asset ownership compared to the comparison communities.

The project activities were intended not only to provide short-term support to vulnerable households, but also to build their resilience to shocks and stresses. One indicator of success in this respect was to examine the coping strategies adopted by households during the lean season of 2013. Households were asked about whether they adopted a series of coping strategies, some of which are quite common in the project area and may be a normal part of households' risk management – such as receiving remittances or migrating for work – and some of which are clearly negative – such as selling assets or removing children from school. Unexpectedly, households in the project communities (among both the 'very poor' and the 'poor' groups) said that they had adopted more coping strategies during 2013 than had those in the comparison communities. This applied both to coping strategies regularly used by households and to more unusual strategies adopted to cope during that specific season. The implication from this result, that households in the project communities were more vulnerable during 2013 than those in the comparison communities, contrasts with evidence from other outcomes discussed above (such as the higher food consumption among the 'very poor' households in the project communities, and the greater dietary diversity among both 'very poor' and 'poor' households). It is possible that this apparent difference is in fact caused by those supported by the project generally feeling more confident in discussing the coping strategies they had adopted than were the comparison respondents.

The 16 indicators of resilience were used to create a multidimensional index of resilience for each household. Households in the 'poor' group were found to score positively on average in 45 per cent of the characteristics of resilience, while those in the 'very poor' group scored positively in 42 per cent of the characteristics. While there are clear differences between the households in the project and comparison communities in terms of several of the characteristics of resilience, there is little evidence of a difference on the index of overall resilience. There is some indication of a small positive effect from the project on the resilience index among the 'very poor' households, but this conclusion cannot be stated with confidence.

6.2 PROGRAMME LEARNING CONSIDERATIONS

Use the results of this Effectiveness Review to contribute to the evidence base on the impacts of cash transfers, in order to inform future decisions on their use by Oxfam and by other actors.

The PASA 5 project has already been important in demonstrating a workable model for providing cash transfers, which has encouraged their adoption by other actors – particularly through the World Bank-funded cash transfer scheme now being implemented in the same area. The results of this Effectiveness Review provide evidence that transfers targeted at ‘very poor’ households had some sustained effect on their level of food consumption some months after the transfers were made. That cash transfer recipients had delayed making crop sales until later in the year and were more likely to have significant savings at the time of the survey, are also positive indications. These findings can be used to strengthen the case when advocating for greater adoption of cash-transfer programmes.

Consider conducting further follow-up work to understand the longer-term impacts of these interventions.

While it would be reasonable to assume that the impact of providing cash transfers would be visible in the short term, the effects of providing agricultural support may take longer to become clear, as participants gain experience and trust in the use of new practices and technologies. Some of the ‘poor’ households who were supported in agricultural production by this project had been receiving that support only in the year prior to the Effectiveness Review, while others had received the support two years previously. It is possible that the full effects of the provision of agricultural training and inputs had yet to become clear at the time the survey was conducted – particularly among those supported during the previous year. (There are no clear differences in outcomes between those who were supported in the first year of the project and those in the second year, but this analysis was limited by the small sample size.) A better understanding of the longer-term effects of the project could be gained by carrying out a follow-up evaluation after another year or two has passed.

Seek to understand how the sharing of resources provided under a project affects the targeting of resources and what this means for monitoring and evaluating the outcomes of a project.

There are some interesting indications from this survey of significant redistribution within communities of the tangible forms of support provided by the project. Sixteen per cent of respondents in the project communities reported that others had shared part of a cash transfer they had received with them. The survey data and focus groups both indicated that the improved seeds had also been shared within the communities, rather than being used exclusively by the households they were given to. It would be useful in planning future interventions to have a better understanding of how this sharing is carried out, and what its consequences are. This behaviour may be seen to undermine the targeting strategy employed by projects, but it certainly means that a full understanding of the impact of a project has to take into account wider impacts than simply those among the direct project participants. Further investigation of how this sharing behaviour affects social relations – for example, whether this tends to empower the recipients of support or whether it increases stress on them by forcing them to prioritise between their own needs and those of others – would also be valuable.

APPENDIX 1: THRESHOLDS FOR CHARACTERISTICS OF RESILIENCE

Dimension	Characteristic	Threshold: a household scores positively if...	Connected to project logic?
Livelihood viability	Ownership of productive assets	Household owns at least one large asset (a motorised plough, motor pump, motorbike or other vehicle) or at least three small assets (animal cart, hand plough, sewing machine or mobile phone).	No
	Crop diversification	Household cultivated at least three types of staple crops and three other crop types during the 12 months prior to the survey.	Yes
	Ownership of livestock	Household owns at least five livestock (cattle, sheep, goats or donkeys)	Yes
	Livelihood diversification	Some household member(s) engage(s) in a household business or seasonal work, which would be able to continue at least 'to some extent' in the event of a flood or illness of the household member responsible.	No
	Use of improved seeds	Household used at least some improved seeds during the 12 months prior to the survey.	Yes
	Use of soil conservation techniques	Household used some soil conservation techniques (such as zaï, demi-lune, cordons pierreux, or haies vives) in the 12 months prior to the survey.	Yes
Innovation potential	Attitudes towards changing practices	Respondent disagrees with both of these statements: <ul style="list-style-type: none"> 'You will continue to do things the way you have always done them, not matter what changes come to this region.' 'We should concentrate on reinforcing our traditional practices, instead of trying new practices.' 	No
	Access to credit	Respondent would be able to borrow 50,000 francs from at least one source, if it were needed for an investment opportunity.	No
Access to contingency resources and support	Savings	Respondent would be able to raise 50,000 francs from the household's own savings if needed for an investment opportunity, or, in the event of the illness of a household member, would be able to fund medical treatment from the household savings or from medical insurance.	Yes
	Social support networks	Respondent agrees with both of these statements: <ul style="list-style-type: none"> 'If you have a difficulty in your household, other people in the community would certainly come to your aid.' 'You assist your relatives and neighbours with food, money and other goods whenever they find themselves in difficulty.' 	No
	Access to a grain bank	Respondent states the household would definitely or probably be able to access grain from a communal grain bank, if there was a food crisis in the next year.	No
Integrity of the natural and built environment	Access to safe drinking water	Household's main source of water for drinking is a protected well, borehole, or piped water, and water has been available from this source every month during the past 12 months.	No
	Access to irrigation	Household engages in kitchen gardening, it takes less than a 30 minute round trip to collect water for the garden, and water was available for at least six of the previous 12 months.	No

Dimension	Characteristic	Threshold: a household scores positively if...	Connected to project logic?
Social and institutional capability	Participation in community groups	At least some male and some female household members participate in any community groups.	No
	Social cohesion in the community	Respondent agrees with the statement 'There is less conflict between people in this community than their used to be.'	No
	Confidence in government structures to deal with crises	Respondent agrees with both of these statements: <ul style="list-style-type: none"> • 'Government services have generally responded well whenever there has been a crisis.' • 'If a crisis were to occur, you are confident that the government would bring you whatever assistance was necessary.' 	No

APPENDIX 2: BASELINE STATISTICS BEFORE MATCHING

	'Very poor' households				'Poor' households			
	Intervention mean	Comparison mean	Difference	Standard error of difference	Intervention mean	Comparison mean	Difference	Standard error of difference
Number of household members in 2009	5.6	5.8	-0.2	(0.3)	6.4	6.2	0.2	(0.3)
Proportion of household members who were children (less than 16 years old) in 2009	% 46.4	48.0	-1.6	(2.4)	51.3	51.7	-0.3	(2.1)
Household had only one adult member in 2009	% 14.0	10.5	3.45	(3.3)	5.9	10.7	-4.7	(2.9)
Household had no male adult members in 2009	% 19.3	9.8	9.6***	(3.5)	2.0	6.15	-4.2*	(2.15)
All adult household members were elderly (over 60 years old) in 2009	% 5.3	2.3	3.0	(1.9)	3.3	0.0	3.3***	(1.1)
Household head is female	% 27.3	12.5	14.8***	(3.9)	6.6	9.0	-2.4	(2.8)
Age of household head in 2009	years 55.0	48.1	6.9***	(1.6)	48.3	45.5	2.8*	(1.5)
Household head was elderly (over 60 years old) in 2009	% 36.0	25.4	10.6**	(4.7)	21.7	17.2	4.5	(4.05)
Household head has any education	% 19.3	23.4	-4.1	(4.3)	27.0	22.1	4.8	(4.4)
Household head completed primary education	% 2.0	1.6	0.4	(1.3)	2.0	2.5	-0.5	(1.5)
Household head completed secondary education	% 0.0	0.0	0.0	(0.0)	1.3	0.4	0.9	(0.9)
Household head is of Bambara ethnicity	% 84.0	78.1	5.9	(4.1)	72.4	78.3	-5.9	(4.4)
Household head is of Sénoufo ethnicity	% 7.3	9.8	-2.4	(2.9)	13.8	10.7	3.2	(3.35)
Household head is of Fulani ethnicity	% 4.0	5.9	-1.9	(2.3)	7.2	5.7	1.5	(2.5)
Respondent is the head of household	% 34.0	81.6	-47.6***	(4.3)	82.2	84.8	-2.6	(3.8)
Respondent is female	% 88.0	28.9	59.1***	(4.2)	19.1	22.5	-3.5	(4.2)
Age of respondent in 2009	years 44.5	45.2	-0.7	(1.7)	45.8	44.0	1.8	(1.5)
Respondent was elderly (over 60 years old) in 2009	% 20.7	20.7	-0.0	(4.2)	20.4	15.2	5.2	(3.9)
Respondent has any education	% 18.0	20.3	-2.3	(4.1)	25.7	21.3	4.35	(4.35)
Respondent has completed primary education	% 0.7	1.2	-0.5	(1.0)	2.0	2.5	-0.5	(1.5)
Respondent has completed secondary education	% 0.0	0.4	-0.4	(0.5)	1.3	0.4	0.9	(0.9)
Proportion of adult household members in 2009 with any education	% 17.4	16.7	0.8	(2.7)	22.8	18.2	4.6	(3.0)
Proportion of adult household members in 2009 who completed primary education	% 1.1	1.9	-0.8	(0.8)	2.9	2.3	0.6	(1.1)
Proportion of adult household members in 2009 who completed secondary education	% 0.0	0.3	-0.3	(0.2)	0.7	0.2	0.5	(0.4)
Household cultivated any staple crops in 2009	% 90.7	95.7	-5.0**	(2.5)	98.0	93.4	4.6**	(2.2)
Area of land cultivated with staple crops in 2009	hectares 2.2	2.7	-0.6**	(0.2)	2.75	2.6	0.1	(0.2)
Household engaged in kitchen gardening in 2009	% 48.0	37.5	10.5**	(5.05)	44.1	32.4	11.7**	(5.0)
Area of land dedicated to kitchen gardening in 2009	planches 3.8	3.5	0.3	(0.8)	4.25	3.5	0.8	(0.8)

	'Very poor' households				'Poor' households			
	Intervention mean	Comparison mean	Difference	Standard error of difference	Intervention mean	Comparison mean	Difference	Standard error of difference
Number of crop types produced by the household in 2009	8.25	6.6	1.7***	(0.4)	7.7	6.2	1.6***	(0.4)
Number of crop types sold by the household in 2009	3.0	1.9	1.1***	(0.3)	2.5	1.8	0.7**	(0.3)
Household owned any livestock (cattle, sheep, goats or donkeys) in 2009	% 64.0	66.4	-2.4	(4.9)	65.1	70.9	-5.8	(4.8)
Number of livestock (cattle, sheep, goats or donkeys) owned by household in 2009	6.1	6.8	-0.7	(1.2)	6.2	7.2	-1.0	(1.2)
Any household member engaged in agricultural labour in 2009	% 36.7	35.9	0.7	(4.95)	29.6	35.2	-5.6	(4.9)
Any household member engaged in a skilled trade in 2009	% 17.3	13.7	3.7	(3.7)	16.4	12.7	3.7	(3.6)
Any household member engaged in petty commerce in 2009	% 22.0	19.9	2.1	(4.2)	23.7	20.1	3.6	(4.25)
Any household member engaged in formal paid employment in 2009	% 1.3	0.4	0.9	(0.9)	3.3	1.2	2.1	(1.45)
Household received remittances during 2009	% 20.7	5.47	15.2***	(3.15)	19.7	4.9	14.8***	(3.1)
Household was in the lowest 20% of the sample according to wealth indicators recalled from 2009	% 26.0	16.8	9.2**	(4.1)	25.0	17.2	7.8*	(4.1)
Household was in the second 20% of the sample according to wealth indicators recalled from 2009	% 22.0	18.8	3.25	(4.1)	21.1	19.3	1.8	(4.1)
Household was in the middle 20% of the sample according to wealth indicators recalled from 2009	% 17.3	21.5	-4.15	(4.1)	19.1	20.5	-1.4	(4.1)
Household was in the fourth 20% of the sample according to wealth indicators recalled from 2009	% 18.7	20.7	-2.0	(4.1)	17.8	21.3	-3.55	(4.1)
Household was in the upper 20% of the sample according to wealth indicators recalled from 2009	% 16	22.3	-6.3	(4.1)	17.1	21.7	-4.6	(4.1)
Household had an electricity connection in 2009	% 2.7	0.8	1.9	(1.6)	0.7	0.0	0.7	(0.5)
Distance of house from nearest market in 2009 minutes on foot (estimated by respondent)	80.6	51.2	29.3***	(6.9)	80.1	53.1	27.1***	(7.1)
Number of observations	150	256			152	244		

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Variables dated 2009 are estimates, based on recall data or reconstructed from the composition of the household at the time of the survey. The construction of the wealth index is described in Section 5.7.

APPENDIX 3: METHODOLOGY USED FOR PROPENSITY-SCORE MATCHING

The analysis of outcome variables, presented in Section 5 of this report, involved group mean comparisons using propensity-score matching (PSM). The basic principle of PSM is to match each participant with a non-participant that was observationally similar at baseline and to obtain the treatment effect by averaging the differences in outcomes across the two groups after project completion. Unsurprisingly, there are different approaches to matching, i.e. to determining whether or not a household is observationally 'similar' to another household. For an overview, we refer to Caliendo and Kopeinig (2008).²² This appendix describes and tests the specific matching procedure followed in this Effectiveness Review.

Estimating propensity scores

Given that it is extremely hard to find two individuals with exactly the same characteristics, Rosenbaum and Rubin (1983) demonstrate that it is possible to match individuals using a prior probability for an individual to be in the intervention group, naming it *propensity score*. More specifically, propensity scores are obtained by pooling the units from both the intervention and comparison groups and using a statistical probability model (e.g. a probit regression) to estimate the probability of participating in the project, conditional on a set of observed characteristics.

Tables A3.1 to A3.3 present the probit regression results used to estimate the propensity scores in our context. **Error! Reference source not found.** Table A3.1 shows the probit results for the non-parsimonious models (for both 'very poor' and 'poor' households), entering the full set of matching variables considered in this study. To guarantee that none of the matching variables were affected by the intervention, we only considered variables related to baseline, and only those variables that were unlikely to have been influenced by anticipation of project participation (Caliendo, 2008).

Table A3.1: Estimating the propensity score: non-parsimonious model

	'Very poor' households			'Poor' households		
	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
Number of household members in 2009 = 1	0.073	(0.053)	0.171	-0.001	(0.037)	0.972
Proportion of household members who were children (less than 16 years old) in 2009	-0.646	(0.581)	0.266	-0.002	(0.495)	0.997
Household had only one adult member in 2009 = 1	0.108	(0.462)	0.814	-0.127	(0.369)	0.730
Household had no male adult members in 2009 = 1	0.058	(0.482)	0.904	-0.862	(0.641)	0.179
All adult household members were elderly (over 60 years old) in 2009 = 1	0.032	(0.528)	0.952	a		
Household head is female = 1	0.880	(0.461)	0.057	0.108	(0.595)	0.855
Age of household head in 2009 years	0.010	(0.015)	0.505	0.036	(0.015)	0.015
Household head was elderly (over 60 years old) in 2009 = 1	-0.671	(0.380)	0.077	-1.802	(0.696)	0.010
Household head has any education = 1	-0.326	(0.335)	0.329	-0.176	(0.413)	0.670
Household head completed primary education = 1	1.065	(1.648)	0.518	-1.463	(0.862)	0.090
Household head completed secondary education = 1	a			0.992	(2.626)	0.706
Household head is of Bambara ethnicity = 1	0.184	(0.405)	0.650	-0.239	(0.312)	0.445
Household head is of Sénoufo ethnicity = 1	0.195	(0.510)	0.702	0.301	(0.377)	0.424
Household head is of Fulani ethnicity = 1	-0.142	(0.550)	0.796	-0.140	(0.416)	0.736
Respondent is the head of household = 1	-1.680	(0.501)	0.001	-0.250	(0.527)	0.635
Respondent is female = 1	0.583	(0.417)	0.162	-0.271	(0.513)	0.597
Age of respondent in 2009 years	0.005	(0.014)	0.712	-0.021	(0.015)	0.171
Respondent was elderly (over 60 years old) in 2009 = 1	0.547	(0.431)	0.204	1.697	(0.710)	0.017
Respondent has any education = 1	0.173	(0.338)	0.608	0.283	(0.420)	0.500
Respondent has completed primary education = 1	1.052	(1.328)	0.428	a		
Respondent has completed secondary education = 1	a			a		
Proportion of adult household members in 2009 with any education	0.229	(0.654)	0.726	0.306	(0.409)	0.454
Proportion of adult household members in 2009 who completed primary education	-2.898	(2.791)	0.299	0.105	(1.001)	0.916
Proportion of adult household members in 2009 who completed secondary education	a			0.863	(6.053)	0.887
Household cultivated any staple crops in 2009 = 1	-0.685	(0.395)	0.083	0.592	(0.437)	0.175
Area of land cultivated with staple crops in 2009 hectares	-0.130	(0.056)	0.019	-0.007	(0.045)	0.885
Household engaged in kitchen gardening in 2009 = 1	-0.177	(0.281)	0.528	0.061	(0.230)	0.792
Area of land dedicated to kitchen gardening in 2009 <i>planches</i>	-0.005	(0.016)	0.768	0.000	(0.012)	0.981

	'Very poor' households			'Poor' households		
	Coefficient	Standard error	p-value	Coefficient	Standard error	p-value
Number of crop types produced by the household in 2009	0.119	(0.036)	0.001	0.079	(0.030)	0.008
Number of crop types sold by the household in 2009	0.050	(0.041)	0.224	0.000	(0.035)	0.996
Household owned any livestock (cattle, sheep, goats or donkeys) in 2009 = 1	0.037	(0.234)	0.875	-0.007	(0.193)	0.971
Number of livestock (cattle, sheep, goats or donkeys) owned by household in 2009	-0.005	(0.010)	0.658	-0.004	(0.008)	0.597
Any household member engaged in agricultural labour in 2009 = 1	0.064	(0.195)	0.742	-0.239	(0.165)	0.148
Any household member engaged in a skilled trade in 2009 = 1	0.093	(0.279)	0.740	0.188	(0.218)	0.389
Any household member engaged in petty commerce in 2009 = 1	-0.122	(0.237)	0.606	-0.049	(0.191)	0.796
Any household member engaged in formal paid employment in 2009 = 1	-0.651	(1.121)	0.562	0.995	(0.545)	0.068
Household received remittances during 2009 = 1	1.103	(0.311)	0.000	1.175	(0.252)	0.000
Household was in the second 20% of the sample according to wealth indicators recalled from 2009 = 1	0.126	(0.301)	0.675	-0.495	(0.250)	0.048
Household was in the middle 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.199	(0.319)	0.532	-0.832	(0.264)	0.002
Household was in the fourth 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.164	(0.326)	0.615	-0.838	(0.277)	0.003
Household was in the upper 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.749	(0.393)	0.057	-1.071	(0.312)	0.001
Distance of house from nearest market in 2009 minutes on foot (estimated by respondent)	0.003	(0.001)	0.015	0.004	(0.001)	0.001
Number of observations	406			396		

Notes: Probit regression. Variables dated 2009 are estimates, based on recall data or reconstructed from the composition of the household at the time of the survey. Explanatory variables expressed as $x = 1$ represent binary variables taking values of either 0 or 1. The dependent variable is 1 for households in the project communities, and 0 for those in the comparison communities. The coefficients represent the contribution of each explanatory variable/characteristic to the probability that a woman participates in the project.

^a Variable dropped because of estimability or collinearity with other variables.

The final set of variables used in the matching process were identified using a backwards stepwise regression for each of the two groups, to identify those variables correlated with being in an intervention group at p -values of 0.20 or less. For the 'very poor' group, 12 such variables were identified, whereas for the 'poor' group, 18 variables were identified. Tables A3.2 and A3.3 show the results of the probit models restricted to these final (restricted) sets of matching variables.

Table A3.2: Estimating the propensity score: parsimonious model for ‘very poor’ households

	Coefficient	Standard error	p-value
Household head is female = 1	0.845	(0.380)	0.026
Age of household head in 2009 years	0.018	(0.009)	0.052
Household head was elderly (over 60 years old) in 2009 = 1	-0.720	(0.335)	0.032
Respondent is the head of household = 1	-1.478	(0.389)	0.000
Respondent is female = 1	0.612	(0.366)	0.094
Respondent was elderly (over 60 years old) in 2009 = 1	0.480	(0.322)	0.136
Household cultivated any staple crops in 2009 = 1	-0.526	(0.355)	0.138
Area of land cultivated with staple crops in 2009 hectares	-0.122	(0.050)	0.015
Number of crop types produced by the household in 2009	0.116	(0.023)	0.000
Household received remittances during 2009 = 1	1.020	(0.293)	0.000
Household was in the upper 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.583	(0.240)	0.015
Distance of house from nearest market place in 2009 minutes on foot (estimated by respondent)	0.003	(0.001)	0.012
Number of observations	406		

Notes: Probit regression. Variables dated 2009 are estimates, based on recall data or reconstructed from the composition of the household at the time of the survey. Explanatory variables expressed as $x = 1$ represent binary variables taking values of either 0 or 1. The dependent variable is 1 for households in the project communities, and 0 for those in the comparison communities. The coefficients represent the contribution of each explanatory variable/characteristic to the probability that a woman participates in the project.

Table A3.3: Estimating the propensity score: parsimonious model for ‘poor’ households

	Coefficient	Standard error	p-value
Household had no male adult members in 2009 = 1	-1.060	(0.427)	0.013
Age of household head in 2009 years	0.034	(0.012)	0.006
Household head was elderly (over 60 years old) in 2009 = 1	-1.622	(0.621)	0.009
Household head completed primary education = 1	-0.952	(0.612)	0.120
Household head is of Sénoufo ethnicity = 1	0.523	(0.222)	0.019
Age of respondent in 2009 years	-0.019	(0.012)	0.111
Respondent was elderly (over 60 years old) in 2009 = 1	1.517	(0.635)	0.017
Proportion of adult household members in 2009 with any education	0.427	(0.261)	0.102
Household cultivated any staple crops in 2009 = 1	0.583	(0.416)	0.161
Number of crop types produced by the household in 2009	0.084	(0.020)	0.000
Any household member engaged in agricultural labour in 2009 = 1	-0.210	(0.156)	0.180
Any household member engaged in formal paid employment in 2009 = 1	1.110	(0.515)	0.031
Household received remittances during 2009 = 1	1.192	(0.240)	0.000
Household was in the second 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.459	(0.232)	0.048
Household was in the middle 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.781	(0.235)	0.001
Household was in the fourth 20% of the sample according to wealth indicators recalled from 2009 = 1	-0.820	(0.236)	0.001
Household was in the upper 20% of the sample according to wealth indicators recalled from 2009 = 1	-1.083	(0.245)	0.000
Distance of house from nearest market place in 2009 minutes on foot (estimated by respondent)	0.004	(0.001)	0.001
Number of observations	396		

Notes: Probit regression. Variables dated 2009 are estimates, based on recall data or reconstructed from the composition of the household at the time of the survey. Explanatory variables expressed as $x = 1$ represent binary variables taking values of either 0 or 1. The dependent variable is 1 for households in the project communities, and 0 for those in the comparison communities. The coefficients represent the contribution of each explanatory variable/characteristic to the probability that a woman participates in the project.

Defining the region of common support

After estimating the propensity scores, the presence of a good *common support area* needs to be checked. The area of common support is the region where the propensity score distributions of the treatment and comparison groups overlap. The common support assumption ensures that ‘treatment observations have a comparison observation “nearby” in the propensity score distribution’ (Heckman, LaLonde and Smith, 1999). Since some significant differences were found between the intervention and comparison groups in terms of their baseline characteristics (as detailed in Section 4.2), some of the women in the intervention group are too different from the comparison group to allow for meaningful comparison. We used a minima and maxima comparison, deleting all observations whose propensity score is smaller than the minimum and larger than the maximum in the opposite group (Caliendo, 2008). Among the ‘very poor’ households, 33 of the 150 households in the project communities and 43 of the 256 households in the comparison communities were dropped because they lay outside the area of common support. Among the ‘poor’ households, only four of the 152 households in the project communities and 23 of the 244 households in the comparison communities were dropped for that reason. The consequence of dropping project participant households is that the estimates of differences in outcome characteristics between the various treatment groups only apply to those intervention households that were not dropped; that is, they do not represent the surveyed population as a whole.

Figures A3.1 and A3.2 illustrate the area of common support and indicates the proportion of women lying on and off the common support area, by treatment group.

Figure A3.1: Propensity score on and off area of common support: ‘very poor’ households

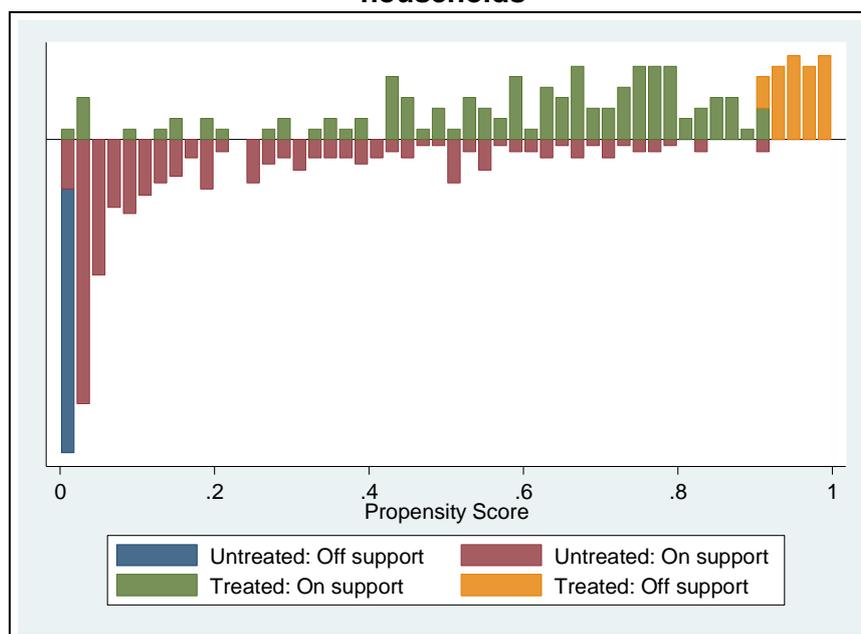
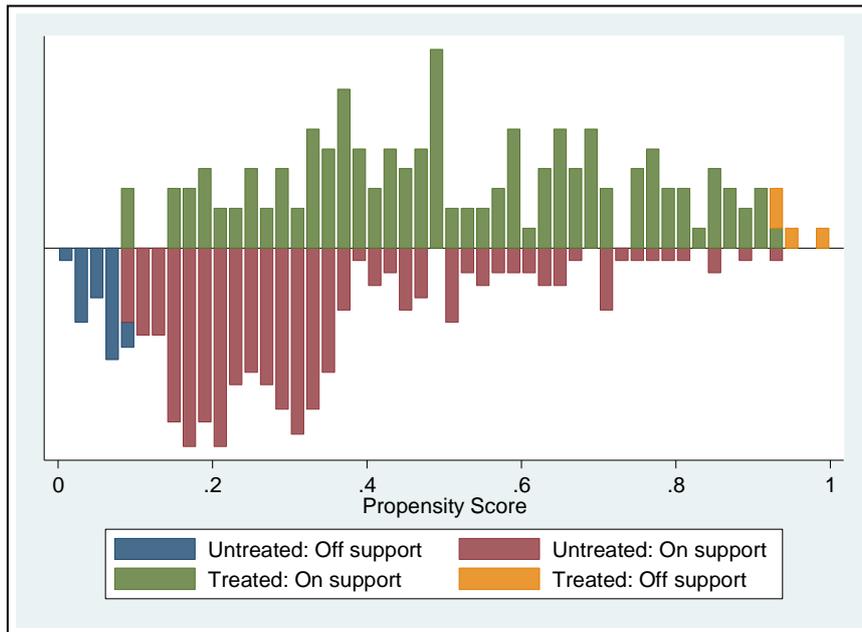


Figure A3.2: Propensity score on and off area of common support: ‘poor’ households



Matching intervention and comparison households

Following Rosenbaum and Rubin (1983), after estimating the propensity scores and defining the area of common support, individuals are matched on the basis of their propensity score. The literature has developed a variety of matching procedures. For the main results presented in this Effectiveness Review we chose to employ the method of kernel matching (alternative matching procedures were used as robustness checks). Kernel matching weights the contribution of each comparison group member, attaching greater weight to those comparison observations that provide a better match with the treatment observations. One common approach is to use the normal distribution with mean zero as a kernel, and weights given by the distribution of the differences in propensity score. Thus ‘good’ matches are given greater weight than ‘poor’ matches.

We used the *psmatch2* module in Stata with the default bandwidth of 0.06, and restricted the analysis to the area of common support. When using PSM, standard errors of the estimates were bootstrapped using 1,000 repetitions (clustered by community), to account for the additional variation caused by the estimation of the propensity scores and the determination of the common support.²³

Check balancing

For PSM to be valid, the intervention group and the matched comparison group need to be balanced, in that they need to be similar in terms of their observed baseline characteristics. This should be checked. The most straightforward method to do this is to test whether there are any statistically significant differences in baseline covariates between the intervention and comparison groups in the matched sample. Efforts were made to ensure that the covariates were balanced across groups at *p*-values greater than 0.20. The balance of each of the matching variables after kernel matching is shown in Tables A3.4 and A3.5. None of the variables implemented for the matching are statistically significant in the matched sample.

Table A3.4: Balancing test on the restricted set of matching variables among ‘very poor’ households

	Treated	Untreated	p-value
Household head is female = 1	0.250	0.274	0.728
Age of household head in 2009 years	52.738	52.107	0.789
Household head was elderly (over 60 years old) in 2009 = 1	0.321	0.321	1.000
Respondent is the head of household = 1	0.417	0.488	0.355
Respondent is female = 1	0.810	0.738	0.271
Respondent was elderly (over 60 years old) in 2009 = 1	0.190	0.190	1.000
Household cultivated any staple crops in 2009 = 1	0.929	0.964	0.307
Area of land cultivated with staple crops in 2009 hectares	2.509	2.631	0.710
Number of crop types produced by the household in 2009	6.607	7.179	0.345
Household received remittances during 2009 = 1	0.095	0.107	0.800
Household was in the upper 20% of the sample according to wealth indicators recalled from 2009 = 1	0.202	0.214	0.850
Distance of house from nearest market place in 2009 minutes on foot (estimated by respondent)	59.024	61.619	0.788
Number of observations	117	213	

Notes: Variables dated 2009 are estimates, based on recall data or reconstructed from the composition of the household at the time of the survey. Explanatory variables expressed as $x = 1$ represent binary variables taking values of either 0 or 1.

Table A3.4: Balancing test on the restricted set of matching variables among ‘poor’ households

	Treated	Untreated	p-value
Household had no male adult members in 2009 = 1	0.022	0.022	1.000
Age of household head in 2009 years	48.134	46.642	0.390
Household head was elderly (over 60 years old) in 2009 = 1	0.209	0.164	0.349
Household head completed primary education = 1	0.015	0.015	1.000
Household head is of Sénoufo ethnicity = 1	0.149	0.142	0.863
Age of respondent in 2009 years	45.866	44.649	0.492
Respondent was elderly (over 60 years old) in 2009 = 1	0.201	0.157	0.341
Proportion of adult household members in 2009 with any education	0.210	0.217	0.856
Household cultivated any staple crops in 2009 = 1	0.978	0.985	0.653
Number of crop types produced by the household in 2009	7.299	7.328	0.950
Any household member engaged in agricultural labour in 2009 = 1	0.291	0.313	0.691
Any household member engaged in formal paid employment in 2009 = 1	0.030	0.022	0.703
Household received remittances during 2009 = 1	0.134	0.090	0.247
Household was in the second 20% of the sample according to wealth indicators recalled from 2009 = 1	0.201	0.187	0.758
Household was in the middle 20% of the sample according to wealth indicators recalled from 2009 = 1	0.179	0.201	0.642
Household was in the fourth 20% of the sample according to wealth indicators recalled from 2009 = 1	0.201	0.239	0.463
Household was in the upper 20% of the sample according to wealth indicators recalled from 2009 = 1	0.179	0.209	0.538
Distance of house from nearest market place in 2009 minutes on foot (estimated by respondent)	69.284	65.425	0.645
Number of observations	148	221	

Notes: Variables dated 2009 are estimates, based on recall data or reconstructed from the composition of the household at the time of the survey. Explanatory variables expressed as $x = 1$ represent binary variables taking values of either 0 or 1.

Similarly, as shown in Table A3.5, we also pass the balancing tests when using the full (unrestricted) set of matching variables. Only two variables in the complete set are unbalanced with p -values of less than 0.2 among the ‘very poor’ group, and only one variable is unbalanced with a p -value of less than 0.2 among the ‘poor’ group.

Table A3.5: Balancing tests on the full set of baseline covariates

	'Very poor' households			'Poor' households		
	Treated	Untreated	p-value	Treated	Untreated	p-value
Number of household members in 2009 = 1	5.619	5.595	0.955	6.493	6.425	0.855
Proportion of household members who were children (less than 16 years old) in 2009	0.472	0.485	0.720	0.514	0.531	0.497
Household had only one adult member in 2009 = 1	0.131	0.143	0.824	0.045	0.082	0.212
Household had no male adult members in 2009 = 1	0.167	0.190	0.689	0.022	0.022	1.000
All adult household members were elderly (over 60 years old) in 2009 = 1	0.071	0.036	0.307	0.030	0.000	0.044
Household head is female = 1	0.250	0.274	0.728	0.060	0.067	0.803
Age of household head in 2009 years	52.738	52.107	0.789	48.134	46.642	0.390
Household head was elderly (over 60 years old) in 2009 = 1	0.321	0.321	1.000	0.209	0.164	0.349
Household head has any education = 1	0.202	0.214	0.850	0.261	0.224	0.478
Household head completed primary education = 1	0.024	0.024	1.000	0.015	0.015	1.000
Household head completed secondary education = 1	0.000	0.000	.	0.007	0.000	0.318
Household head is of Bambara ethnicity = 1	0.821	0.810	0.844	0.709	0.739	0.586
Household head is of Sénoufo ethnicity = 1	0.071	0.060	0.757	0.149	0.142	0.863
Household head is of Fulani ethnicity = 1	0.060	0.071	0.757	0.082	0.067	0.643
Respondent is the head of household = 1	0.417	0.488	0.355	0.821	0.866	0.315
Respondent is female = 1	0.810	0.738	0.271	0.201	0.179	0.642
Age of respondent in 2009 years	44.298	44.369	0.978	45.866	44.649	0.492
Respondent was elderly (over 60 years old) in 2009 = 1	0.190	0.190	1.000	0.201	0.157	0.341
Respondent has any education = 1	0.131	0.119	0.817	0.246	0.201	0.381
Respondent has completed primary education = 1	0.012	0.000	0.319	0.015	0.015	1.000
Respondent has completed secondary education = 1	0.000	0.000	.	0.007	0.000	0.318
Proportion of adult household members in 2009 with any education	0.144	0.152	0.826	0.210	0.217	0.856
Proportion of adult household members in 2009 who completed primary education	0.009	0.018	0.475	0.026	0.028	0.835
Proportion of adult household members in 2009 who completed secondary education	0.000	0.000	.	0.004	0.001	0.528
Household cultivated any staple crops in 2009 = 1	0.929	0.964	0.307	0.978	0.985	0.653
Area of land cultivated with staple crops in 2009 hectares	2.509	2.631	0.710	2.825	3.009	0.417
Household engaged in kitchen gardening in 2009 = 1	0.357	0.393	0.635	0.403	0.418	0.805
Area of land dedicated to kitchen gardening in 2009 planches	3.321	3.226	0.927	3.985	4.254	0.786
Number of crop types produced by the household in 2009	6.607	7.179	0.345	7.299	7.328	0.950
Number of crop types sold by the household in 2009	2.238	2.476	0.616	2.410	2.515	0.782
Household owned any livestock (cattle, sheep, goats or donkeys) in 2009 = 1	0.607	0.702	0.196	0.664	0.724	0.291
Number of livestock (cattle, sheep, goats or donkeys) owned by household in 2009	5.988	7.250	0.470	6.269	7.851	0.208
Any household member engaged in agricultural labour in 2009 = 1	0.357	0.369	0.873	0.291	0.313	0.691
Any household member engaged in a skilled trade in 2009 = 1	0.107	0.107	1.000	0.149	0.149	1.000
Any household member engaged in petty commerce in 2009 = 1	0.179	0.286	0.101	0.194	0.231	0.457
Any household member engaged in formal paid employment in 2009 = 1	0.000	0.012	0.319	0.030	0.022	0.703
Household received remittances during 2009 = 1	0.095	0.107	0.800	0.134	0.090	0.247
Household was in the second 20% of the sample according to wealth indicators recalled from 2009 = 1	0.238	0.202	0.579	0.201	0.187	0.758
Household was in the middle 20% of the sample according to wealth indicators recalled from 2009 = 1	0.190	0.190	1.000	0.179	0.201	0.642
Household was in the fourth 20% of the sample according to wealth indicators recalled from 2009 = 1	0.167	0.238	0.252	0.201	0.239	0.463
Household was in the upper 20% of the sample according to	0.202	0.214	0.850	0.179	0.209	0.538

	'Very poor' households			'Poor' households		
	Treated	Untreated	p-value	Treated	Untreated	p-value
wealth indicators recalled from 2009 = 1						
Distance of house from nearest market in 2009 minutes on foot (estimated by respondent)	59.024	61.619	0.788	69.284	65.425	0.645
Number of observations	117	213		148	221	

NOTES

- 1 The process in the commune of Fakola was slightly different. All 14 communities in Fakola were included in the Food Facility project. Only 10 of those communities could be included in PASA 5: this selection was made at a meeting involving representatives from all the communities.
- 2 In addition, three respondents from comparison communities reported having received a cash transfer since 2009. No other organisations were known to have been distributing cash transfers in the area since 2009, so again these responses seem likely to be the result of recall error or confusion.
- 3 As a check on the validity of the comparison group, respondents were also asked whether their household had participated in Cash for Work activities or had received food distributions since 2009. Only three per cent and two per cent of the project participants respectively reported having received these types of support. Although these figures were significantly higher than in the comparison communities, where only one respondent reported having received each type of support, the numbers involved are so small that they are not thought to present a threat to the robustness of the comparison being made.
- 4 As would be expected, the proportions having received hygiene training, which was not provided under this project, did not differ between project and comparison communities.
- 5 As shown in column 4 of Table 5.3, the estimate derived from the PSM kernel model is statistically significant only at the 10 per cent level – but estimates derived from all the alternative statistical models are significant at at least the 5 per cent level. Respondents were also asked to recall whether they were using each of these agricultural techniques at baseline in 2009, allowing the creation of an outcome variable representing adoption of the technique since 2009. The estimate of the difference in adoption of organic fertiliser since 2009 is statistically significant at the 1 per cent level for the 'poor' households, even using the PSM kernel model.
- 6 This applies even after taking a logarithmic transformation of the total quantity produced.
- 7 Each of the alternative estimation procedures tested are statistically significant at at least the 10 per cent level, for the 'very poor' group, the 'poor' group, and the overall result.
- 8 However, the estimated differences derived from the various statistical models are consistently positive, among both the 'very poor' and the 'poor' group, and some of the estimates are statistically significant.
- 9 Only 14 per cent of the 'poor' households in the project communities said that they had borrowed in order to buy food during the 12 months prior to the survey (as either the most or second-most important reason for borrowing), compared to 25 per cent of the corresponding comparison households. Sixteen per cent of those in the project communities said that they had borrowed to pay for medical treatment, against 26 per cent of comparison households. In both cases the estimated differences are consistently statistically significant at at least the 10 per cent level under each of the different statistical models tested. There are no indications of significant differences on these measures between 'very poor' households in the project and comparison communities.
- 10 Only four of the 150 'very poor' project participants interviewed reported using their cash transfer directly to repay a loan.
- 11 Respondents were also asked to recall how many of each type of livestock their household owned in 2009, allowing the construction of a difference-in-difference measure for livestock ownership. Using this measure there are again no significant differences between households in the project and comparison communities.
- 12 Jennifer Coates, Anne Swindale and Paula Bilinsky, Household Food Insecurity Access Scale (HFAS) for Measurement of Food Access: Indicator Guide, version 3, Food and Nutrition Technical Assistance Project (FANTA), August 2007: <http://www.fantaproject.org/monitoring-and-evaluation/household-food-insecurity-access-scale-hfias>
- 13 Perhaps not surprisingly, female survey respondents were more likely to report gender differences in the food security problems experienced by household members than were male respondents ($p < 0.01$). They may also have been more likely to report differences between the food security problems experienced by adults and children: the difference is statistically significant at the 10 per cent level.
- 14 Adding an interaction term representing having been participating in the project since 2012 to the parametric PSM model used to estimate the overall project effect, results in a coefficient on that interaction term that is large (approximately 0.65 points on the food security score) and statistically significant at the 5 per cent level. Similar interaction terms added to ordinary least squares regression models are statistically significant at the 10 per cent level.
- 15 To reflect that the existence of economies of scale within households, and the lower consumption needs of children, the formula used for calculating household size is $\frac{A + Kc}{1 + c}$, where A is number of adults in the household; K is the number of children; c is the consumption of a child relative to an adult; and $\frac{1}{1 + c}$ stands for the extent of economies of scale. This effectiveness review follows the common practice of setting c equal to 0.33 and $\frac{1}{1 + c}$ equal to 0.9, but the findings are not sensitive to reasonable changes in these parameters.
- 16 The estimates of the effects on food consumption both before and after logarithmic transformation are statistically significant at a level of at least 5 per cent under most of the alternative estimation procedures used.

- 17 The estimates derived from most of the alternative estimation procedures are larger: for example, 0.22 from the parametric PSM kernel model.
- 18 Cronbach's alpha was used to measure this inter-item correlation. The Cronbach's alpha obtained for all the indicators for the recalled 2009 data was 0.84. This alpha was increased to 0.87 by removing those items that had a low correlation with the others. The alpha derived for the index of change in wealth indicators was originally 0.84, and was increased to 0.86 by removing those items that had a low correlation with the others.
- 19 This approach is described in 'A Multidimensional Approach to Measuring Resilience', Oxfam GB working paper, August 2013: <http://policy-practice.oxfam.org.uk/publications/a-multidimensional-approach-to-measuring-resilience-302641>.
- 20 It will be noted that in calculating these overall measures of resilience, each of the individual characteristics presented in Table 5.13 was weighted equally. This means that the index is weighted more towards characteristics of livelihood viability, and less so towards the other four dimensions. Alternative weights could be given to the various characteristics and dimensions, which would necessarily result in changes in the overall indices and potentially in the magnitude of differences between the intervention and comparison groups.
- 21 Each of the alternative statistical models used produces an estimate of a positive difference of 0.03 to 0.04 that is statistically significant at least at the 10 per cent level.
- 22 Caliendo, M. and Kopeinig, S. 2008. 'Some Practical Guidance for the Implementation of Propensity Score Matching', *Journal of Economic Surveys*, Wiley Blackwell, vol. 22(1), pages 31–72.
- 23 Bootstrapping is a statistical procedure where repeated samples are drawn from the original sample and parameters, such as standard errors, are re-estimated for each draw. The bootstrapped parameter is calculated as the average estimate over the total number of repeated draws.

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