
LIVELIHOODS IN SOMALIA

Impact evaluation of community driven livelihood and food security initiatives in Lower and Middle Juba Regions

Effectiveness Review Series

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ANDREW ANGUKO

OXFAM GB



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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. The project 'Community Driven Livelihood and Food Security Initiatives (CLFSI) in Lower and Middle Juba Regions of South Somalia' (SOMA67) was one of those selected for an Effectiveness Review in the 2014/15 financial year.

The project's overall objective was to contribute to improved income generation and food security of families in eleven regions in South Somalia. Project activities included a cash grant for household businesses (IGA); provision of donkey carts for transport services; restocking of livestock herds; donation of agricultural equipment; donation of other agricultural inputs, e.g. seeds; support in rehabilitation of irrigation systems including the donation of water pumps; and provision of cash for work. It should be noted that agricultural activities, including support in rehabilitation of irrigation systems, was not given attention as planned and consequently few of these activities were actually carried out.

The project activities were implemented by Oxfam GB in conjunction with a local partner organisation – Wajir South Development Association (WASDA). Phase 1 of the project started in 2010 and completed in March 2013. Data collection for the Effectiveness Review took place in October/November 2014. The baseline survey for the second phase of the project, which intends to scale up the first phase, was recently completed.

EVALUATION APPROACH

The review adopted a quasi-experimental impact evaluation design, which involved comparing households that had been supported by the project with households in neighbouring communities that had similar characteristics in 2009.

The Effectiveness Review was carried out in the regions where the project activities had been implemented since at least 2009. Within those regions, the households that had participated in the project during the period were selected at random to be interviewed. For comparison purposes, interviews were also carried out with households that had not participated in the project, but who were eligible and had expressed an interest in doing so. In total, 200 project participants and 434 non-participants were interviewed. At the analysis stage, the statistical tools of propensity-score matching and multivariate regression were used to control for demographic and baseline differences between the households surveyed in project and comparison areas, to provide confidence when making estimates of the project's impact.

RESULTS

The survey results provide good evidence that the interventions have made a positive contribution to the livelihoods of the target population.

One key question was to check whether the numbers of livestock owned by households and livestock sales have changed. Survey respondents were asked to state the number of livestock sold in the past 12 months (oxen, cows, goats, sheep, herd camels, park camels and donkeys) and the numbers owned by their households now and in 2009. Specifically, they were asked to approximate the number of livestock owned by respondents and their household members, excluding extended family; and finally, livestock owned by respondents and their household members in 2009, excluding extended family. The results show that on average respondents and their household members now own two more goats and 50 per cent more sheep than households in comparison areas. Interestingly, on average households in comparison areas owned a higher number of goats, sheep and herd camels in 2009. This demonstrates the impact of restocking animals in intervention areas since households participating in the project now have a higher number of goats and sheep, on average, than their counterparts in comparison areas that were better off in 2009. However, there was no significant difference between households that participated in the project and those that did not in terms of numbers of livestock sold in the past 12 months.

The second question of this Effectiveness Review was whether household members participated in community groups. The respondents were asked to state whether household members, and more specifically, whether male, female or both genders, participated in group meetings both now and in 2009. This was meant to help understand the effectiveness of committees formed to help manage the project. These committees were responsible for the identification of activities to be carried out and selection of beneficiaries based on poverty and vulnerability. In addition, they took part in implementation, monitoring of the project and accountability issues. This included committees such as the Project Accountability Committee (PAC), the Project Monitoring Committee (PMC) and the Project Implementation Committee (PIC). The groups identified included village elders; trade associations; committees for managing, implementing or monitoring projects; savings groups; women's groups; youth groups; religious groups; and other groups.

The results indicate that there was a 20 percentage point significant difference in participation in group meetings between respondents in participant households and their household members, compared with non-participants respondents. On average, there was 12 percentage point increase in the number of women in intervention areas reporting participation in group meetings compared with their female counterparts in comparison areas. It is important to note that there was no significant difference between respondents and their household members regarding participation in group meetings in intervention and comparison areas in 2009 when the project was initiated. This indicates that the formation of committees increased participation of household members, particularly women, in the project areas through community mobilisation carried out by the committees. Lessons learned on how to increase participation demonstrated by this Effectiveness Review can be utilised in implementing other projects in this community.

Thirdly, respondents were asked whether their perceived income from milk and livestock sales had increased or decreased since the beginning of the project. It should be noted that this was a subjective measure of change in income from livestock and milk sales. On average there was a 15.9 percentage point increase and a 17 percentage point increase in the number of participant households reporting increased income from milk and livestock sales respectively compared with non-participants. The

increase in livestock sales reported contradicts the findings using an objective measure of livestock sales. Using the quantitative measure of livestock sales, there was no significant difference between the intervention and comparison households.

Another outcome that was investigated was the use of donkey carts that were donated to the project participants for income generation. The respondents were asked whether they, or any other member of their households, had received donkey carts at any time since 2009. On average, there was a 5.9 percentage point difference in the number of participant households reporting use of donkey carts for income generation compared with non-participants. The income derived from donkey carts could be one of the reasons for the observed statistically significant difference in the wealth index between participant and non-participant households. It is possible that participant households used income derived from the services provided by donkey carts to purchase more household assets.

The Effectiveness Review also sought to understand whether there was a change in income from household businesses. The respondents were asked to approximate the revenues obtained from the household businesses in a typical month over the past year and also in 2009. The households that received the cash carried out businesses, such as butcheries, selling clothes, running a small kiosk, and other small household businesses. It is important to note that on average, participant households reported obtaining more income from the businesses compared to the non-participants, but this was not statistically significant. In addition, the income received from these businesses in a typical month in the past year was higher than that received in 2009 for both groups. One point to note is that a significantly higher percentage of respondents in the intervention group (41.5 per cent) reported receiving a cash grant for household businesses compared with only 2 per cent in the comparison group. The mean difference (39.5 per cent) was statistically significant and yet this did not translate into increased income from household businesses for the project participants. It is therefore likely that after receiving the money, most of the participants did not go into the businesses and possibly diverted the money to other uses.

Key results of this Effectiveness Review

Outcome	Evidence of positive Impact	Comments
Increased livestock ownership by households	YES	On average, the numbers of goats increased by 2 in intervention households while the number of sheep increased by about 50% in households that participated in the project compared with households that did not.
Participation in community groups	YES	Participation of women and their household members increased by about 20 percentage points while participation of women alone in group meetings increased by about 12 percentage points in intervention areas compared with comparison areas.
Use of donkey carts for income generation	YES	On average there was a 5.9 percentage point increase in the number of participant households reporting the use donkey carts for transport services thereby increasing their income compared with households in comparison communities.
Increased income from milk sales	YES	On average, there was a 15.9 percentage point increase in the number of participant households reporting increased income from

		milk sales compared with non-participants.
Community involvement in project Management	YES	On average, there was a 14 percentage point significant difference between participant households and non-participants with regard to asking questions on how new projects benefit them. This is important because by asking about project benefits they can influence the kind of activities based on immediate needs of the community.
Household asset wealth (Wealth index)	YES	There is evidence to show that the wealth index of households in intervention areas has steadily increased since 2009 whereas that of the comparison households has remained almost constant.
Increased income from household businesses	NO	Revenues obtained from household businesses were not significantly different between the participant and non-participant households.
Increase in overall household income (New Global Indicator)	NO	Household income among project participants (as measured by consumption and expenditure) was not significantly different between intervention and comparison households.

One key feature of this project is that the activities and the beneficiaries were identified by the committees. There were three major committees that were formed. These were Project Accountability Committee (PAC), Project Implementation Committee (PIC) and Project Monitoring Committee (PMC). This was considered an innovation for this project. It was therefore important to look at the impact of this aspect of the project. The respondents were asked to state whether they ask questions about how new projects benefit them or whether there is no opportunity to ask questions on new project benefits. On average, there was a 14 percentage point statistically significant difference between participant and non-participant households with regard to asking questions on new project benefits. This is particularly important because by asking questions about project benefits they can influence the kind of activities based on priority needs of the community.

Finally, there is strong evidence suggesting that on average the household wealth index of participant households has steadily increased since 2009 compared with non-participants. The reasons for these results are not clear cut. However, outcomes that are proxy to wealth index may be responsible. It was observed from the analysis that intervention households received cash for work, restocking of livestock herds, increased income from donkey carts, and cash for household businesses. These households could use this income to acquire more household goods and assets thus contributing to the statistically significant difference observed in the wealth index measured using household assets.

Despite these positive outcomes, this analysis fails to identify evidence supporting an increase in overall household income in intervention households. Indicators of total household expenditures and daily per capita food consumption are not statistically different from the comparison group.

PROGRAMME LEARNING CONSIDERATIONS

Project committees should be strengthened to play a bigger role in planning, implementation and monitoring of community livelihoods programmes.

The critical role played by the committees formed to steer the project forward contributed to positive outcomes. The committees were responsible for the identification of activities to be carried out and selection of beneficiaries based on poverty and vulnerability. In addition, they took part in implementation, monitoring of the project and accountability issues. They undertook community mobilization for increased participation of community members in project activities. There is evidence from this Effectiveness Review showing that the Project Implementation, Monitoring and Accountability Committees contributed to increased participation and involvement of community members, especially women, in project activities. This unique feature of the project should be encouraged in future implementation strategies of projects of this nature.

Training component inbuilt in a business model for Income Generating Activities should be considered.

Capacity building of beneficiaries with regard to small household businesses should be a prerequisite before such activities are undertaken. One lesson that can be learnt from this Effectiveness Review is that for Income Generating Activities to succeed as a business model there should be a component of training on the range of businesses available to the recipients prior to the distribution of funds. In this project, no training on business skills was carried out with the beneficiaries before roll-out of the activity. Indeed, there is evidence from this Effectiveness Review that household businesses did not have an impact on the beneficiaries, even though it was the most important activity and accounted for a significant portion of the project budget. Future projects dealing with pastoralist communities should disburse funds to those already involved in household businesses and ensure training of beneficiaries.

Consider Continuous Monitoring System to ensure detection of implementation challenges during the course of the project.

Monitoring is crucial for project implementation since it provides programme staff with the opportunity to observe whether activities are being implemented as planned. Without monitoring, it is difficult to gain an understanding of what happens during project implementation. It was revealed during discussions with project staff that beneficiaries of funds for household businesses were not monitored to ensure that they implemented the activities for which the funds were provided. A monitoring plan that provides a framework on what is to be monitored, the establishment of the frequency of monitoring visits, and how monitoring should be done, need to be developed at the outset for future implementation of such projects.

There is need to further investigate the effect of cultural dynamics on the success of livelihoods interventions in this community.

There is evidence from this Effectiveness Review that the wealth status of beneficiaries, measured using household assets and livestock, improved over the period of implementation. It is possible that the project participants acquired additional livestock with funds meant for household businesses, since as pastoralists they are more inclined towards rearing animals than engaging in small businesses, which was a focus of this project. A deeper understanding of culture and traditions can help

programme staff in similar projects in the future in guiding the community with regard to the choice of activities to be implemented.

1 INTRODUCTION

Oxfam GB has put in place a Global Performance Framework (GPF) as part of its effort to better understand and communicate its effectiveness, as well as to enhance learning across the organisation. This framework requires project and programme teams to annually report output data across six thematic indicator areas. In addition, every year, for each thematic indicator area a modest sample of mature¹ projects is randomly selected to be evaluated through rigorous Effectiveness Reviews. One key focus is on the extent to which they have promoted change in relation to relevant OGB global outcome indicators.

The global outcome indicator for the livelihoods thematic area is defined as the percentage of households demonstrating an increase in household income as measured by household expenditure per capita, compared to a 'typical' comparison household. This indicator is explained in more detail in Section 5.

This Effectiveness Review, which took place in October/November 2014, was intended to evaluate the success of the project 'Community Driven Livelihood and Food Security Initiatives in Lower and Middle Juba regions of South Somalia' in promoting food security and strengthened livelihood options among the project participants. This project was implemented in Middle and Lower Juba Regions of South Somalia, between May 2010 and April 2013, by Oxfam in conjunction with Wajir South Development Association (WASDA). The focus of the review was on 22 villages supported by the project from 2010 through to its completion in April 2013. This was a three-year community-driven food security and livelihoods project targeting 30 villages in Lower Juba region, where 22 villages were guided to identify activities and provided with funds to implement their priority projects. The remaining eight villages were not provided with funds, although they were part of the initial mobilisation and sensitisation. Instead they remained as comparison villages.

Project participants established various committees that were responsible for the design, planning, implementation and monitoring of the project. The committees were also responsible for selecting priority activities for implementation and even the beneficiaries themselves. These committees were: Project Accountability Committee (PAC), Project Monitoring Committee (PMC) and the Project Implementation Committee (PIC), which were involved in spearheading the implementation of the identified priority projects.

This report presents the findings of the Effectiveness Review. Section 2 briefly reviews the project description. Section 3 describes the evaluation design used, and Section 4 describes how this design was implemented. Section 5 presents the results of the data analysis, based on the comparison of outcome measures between the intervention and comparison groups. Section 6 concludes the document with a summary of the findings and some programme learning considerations. Finally, baseline statistics before matching are in Appendix 1 while technical and methodological considerations on the propensity score matching (PSM) are in Appendix 2. Robustness checks are in Appendix 3.

Figure 1: Location of intervention districts

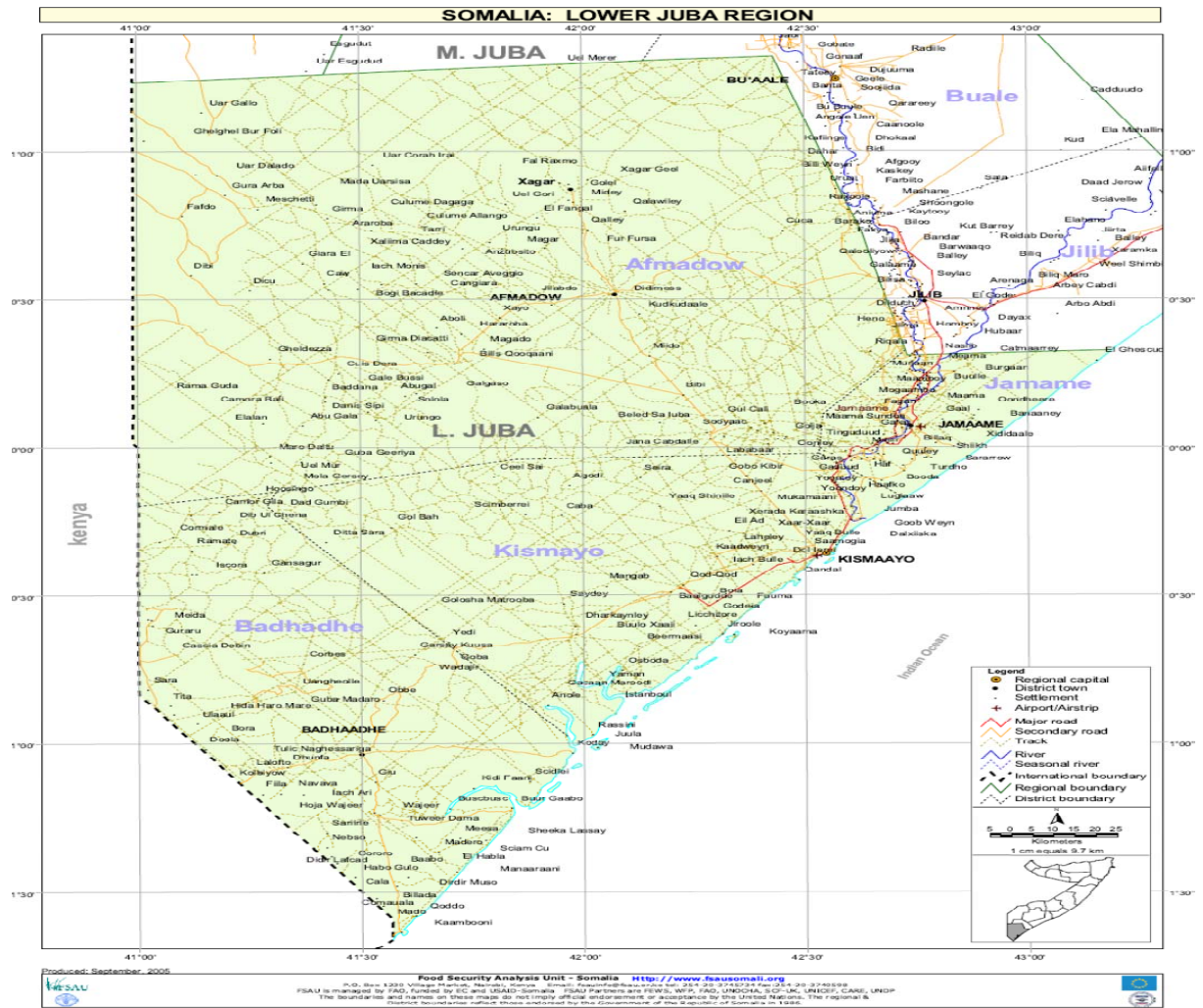
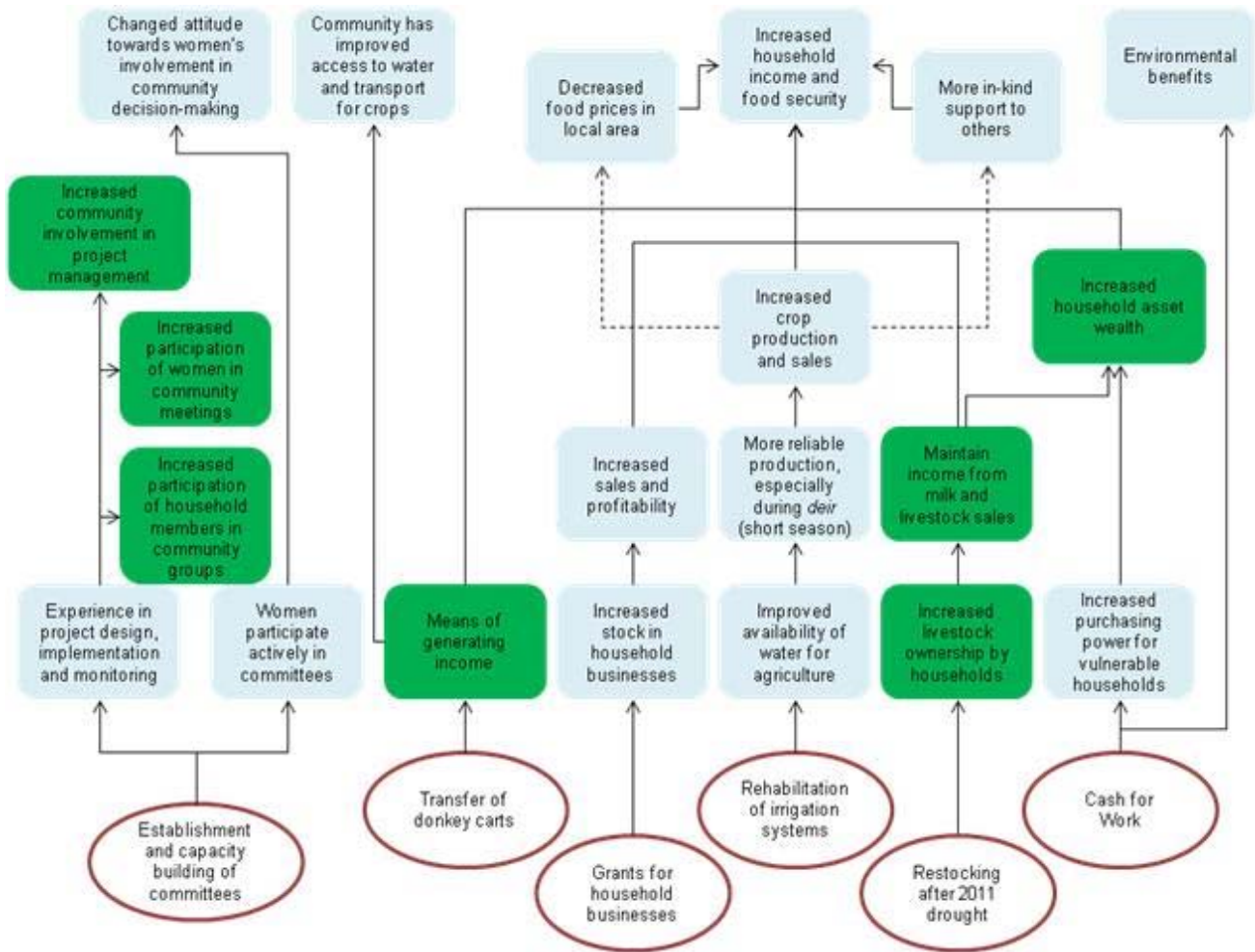


Figure 2 provides a summary of the results found on the different steps in the theory of change.

Figure 2: Project Theory of Change (simplified)



According to the theory of change of the programme, rehabilitation of irrigation systems and provision of agricultural inputs could lead to increased agricultural production through increased availability of water and access to means of production. This ultimately leads to increased revenues from agricultural sales and hence to increases in household income.

Secondly, higher agricultural production and increased crop sales are expected to lead to better food security, measured as higher consumption of food from own production. At the same time, restocking of livestock could lead to the recovery of livestock herds, which could in turn lead to higher milk and livestock sales. Consequently, there could be higher household income and food security and decreased reliance on negative coping strategies.

In addition to this, the project supported the transfer of donkey carts to households with the aim of generating income through the provision of transport services. The donkey carts could be used to transport water from water sources that are far from the dwelling places of the community members. Similarly, the donkey carts could be used to transport farm produce after harvesting. This was expected to lead to the community having improved access to water and transport for crops with increased income from the provision of these services. The project supported cash grants for household businesses. According to the project logic, this was expected to increase the stock of household businesses, thus increasing sales and profitability with the ultimate aim of increasing revenues for the household.

The project established capacity building committees with the intention of ensuring that community members participated actively in community groups and especially in prioritising project activities according to community needs. The committees could also gain experience in project design, implementation and monitoring. With this experience, the community was therefore expected to play a more active role in initiating and managing projects.

2 PROJECT DESCRIPTION

The Lower Juba region in Somalia is known for frequent disasters (man-made, climatic and other natural) leading to displacement of populations and disruption of livelihoods. Each year, more people become dependents as livestock herds, the basic source of livelihood, dwindle and dependency level rises. Conflicts over resources are frequent and increasing, while provision of humanitarian assistance is becoming more difficult as a result of increased insecurity. It is not uncommon to see large populations of internally displaced persons settled in camps without any source of livelihood. Conflicts and recurrent droughts have caused a large population of more than 400,000 people, including IDPs and host communities, to fall into acute food and livelihood crisis. In addition, the poor rains and droughts have resulted in loss of livestock, depletion of pasture and rise in prices of food and water.

Oxfam Great Britain (OGB) having worked in south central Somalia for over 20 years has been aware of the weak institutional systems, inadequate coordination mechanisms, and deficiencies in technical and managerial capacities as well as inadequate organisational abilities of in-country organisations. Oxfam has further noted that age-old traditional community institutions and structures have remained intact and in some cases, have grown in strength to fill the gaps left by collapsed state institutions and service providers. Given the problems noted above, there was need for alternative ways of working in conflict-prone areas such as Somalia. Since 2007, Oxfam GB has been studying and testing alternative ways of working (AWW). A pilot AWW project was implemented in 2008/9. It was found that the pilot action was very successful in addressing livelihood problems and could be replicated in other insecure areas. It was found that the approach was taken as a role model by communities in different villages showing that it could address complex problems in a way that was better appreciated by communities.

Oxfam therefore designed the project on Community Driven Livelihood and Food Security Initiatives (CLFSI) with the firm belief that humanitarian services and development assistance could be channelled effectively through such institutions by adopting alternative ways of working. The overall objective of the project was to utilise this innovative approach and contribute to improved livelihoods using existing community structures and institutions in the Lower Juba region of southern Somalia.

The overall objective of the project was to contribute to strengthening the socio-productive process of sustainable development by promoting competitive economic initiatives in Lower and Middle Juba regions of southern Somalia (Figure: 1). Specifically, the project aimed at strengthening the productive capacity of households by improving their production systems ensuring sustainable food security, income generation through food production, rehabilitation of productive assets e.g. dykes and canals, asset transfer (donkey carts and livestock restocking, cash donation for Income Generating Activities (IGA)) together with rehabilitation of livestock market. Income generating activities focused on supporting small-scale traders with cash and support

to small household business. Livestock restocking was aimed at increasing the number of livestock and milk sales.

One key feature of this project was that communities, working through the Project Accountability Committee (PAC), Project Monitoring Committee (PMC) and Project Implementation Committee (PIC), themselves selected the interventions that would be carried out, and the people who would benefit. The implementers intended that having this project managed by the community would improve the perception of NGOs and increase people's ability to take ownership of other projects too.

3 EVALUATION DESIGN

The central problem in the impact evaluation of any social programme is how to compare the outcomes that result from that programme with *what would have been the case* without that programme having been carried out. In the case of this Effectiveness Review, the situation of households in the villages where the project was implemented were examined through a household questionnaire – but clearly it was not possible to observe what would have been their situation if they not have 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 units that were not. Units where the programme was not implemented can, indeed, provide a good estimate of the counterfactual as long as these – at the outset of the project – can be assumed to be similar to the beneficiary group in all respects except for the implementation of the specific programme.

An ideal approach to an evaluation such as this is to select at random the areas in which the project will be implemented. 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 unit at which the programme was implemented was the household within selected villages. Initially, 30 villages were selected. Within each of the 30 villages where the project was working, 22 specific villages were selected to implement activities. The selection of communities involved in the project was not made at random; in fact, villages were deliberately chosen based on their being particularly poor and vulnerable. Within the selected communities the project worked with those individuals who were already enrolled in formal and informal groups. However, discussions with the implementation staff revealed that there were, in fact, other villages that also were considered suitable for implementation and that could have been covered by the project. Therefore, a 'quasi-experimental' evaluation approach was adopted, in which the situation of households belonging to formal and informal groups in those non-implementation villages was assumed to provide a reasonable counterfactual for the situation of households in the villages that participated in the project.

To improve the confidence in making this comparison, households in the project villages were 'matched' with households with similar characteristics in the non-project (or 'comparison') villages. Matching was performed on the basis of a variety of characteristics – including household size, education level, productive activities, and

indicators of material wellbeing, such as housing conditions and ownership of assets. Since some of these characteristics may have been affected by the project itself (particularly those relating to productive activities and wealth indicators), matching was performed on the basis of these indicators *before* the implementation of the project. Although baseline data were not available, survey respondents were asked to recall some basic information about their household's situation from 2009, before the project was implemented. While this recall data is unlikely to be completely accurate, it should not lead to significant bias in the estimates as long as the measurement errors due to the recall data are not significantly different between the treatment and comparison groups.

Recall survey data provided a variety of baseline household characteristics on which matching could be carried out. These characteristics were used to calculate a 'propensity score', which is the conditional probability of the household being a beneficiary, given the set of observable characteristic in the baseline. Project beneficiary households and comparison households were then matched based on their having propensity scores within certain ranges. Please refer to the Appendix 2 for a more extensive explanation of the matching procedure and tests carried out after matching to assess whether baseline characteristics are similar between the two groups after matching.

As a check on the results derived from the propensity-score matching process, data were also analysed 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 a project participant, 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. Unobserved differences between the groups could potentially include differences in attitudes or motivation (particularly important when individuals have taken the initiative to participate in a project), differences in community leadership, or local-level differences in weather or other contextual conditions faced by households. The choice of which intervention and comparison villages to survey for this Effectiveness Review was made principally to minimise the potential for any such unobservable differences to bias the results.

While efforts were made to minimise potential unobserved differences, this remains a cause for caution when interpreting the statistical results, as will be discussed in Sections 5 and 6.

4 DATA COLLECTION

4.1 SAMPLING APPROACH

The intervention group consists of households that participated in the project from inception to closure. The intervention group members were selected based on their vulnerability. Since it was not possible to include all groups/households due to insufficient resources, some groups/households did not take part in the project activities even though they were also vulnerable. This group therefore formed the

comparison group. It is important to note the difference between these two terms since they have been used frequently in this report.

Table 4.1 shows the villages and number of households sampled for the intervention and comparison groups. The sample frame was constructed by identifying those households that received at least one project intervention line from the project area. Among the households that benefited directly from the project, 220 were randomly selected to be interviewed.

Within the same regions benefiting from the programme, the review identified 16 villages that were categorised as eligible, but were not receiving the project interventions, and interviewed 434 households as a comparison group. For a more detailed explanation of the identification of the comparison group please refer to Section 3.

Selection of households was carried out from the 22 villages where implementation of activities took place. Household lists of beneficiaries were obtained from the chairmen of the committees. The number of households to be interviewed from each of the 22 villages was determined by dividing the number of households in each of the selected villages by the total number of households in the 22 villages and multiplying by the sample size that had been determined for the intervention group. The result provided the number of households to be interviewed from each of the 22 villages.

Using the household lists, systematic random sampling was used to identify the households to be interviewed. In the comparison areas, 16 villages were identified which included the eight villages that had been dropped by the implementation committees. These villages were thought to be similar to the villages where implementation of project activities took place. This means the comparison villages were selected purposively. Households were, however, randomly selected from the comparison villages and interviews undertaken.

A household questionnaire was developed by Oxfam staff to capture data on various outcome and intervention exposure measures associated with the project's activities. Demographic data and recalled baseline data were also collected to statistically control for differences between the intervention and comparison households that could not plausibly be affected by the project. The questionnaire was pre-tested first by Oxfam local staff and then by the enumerators during a practice exercise and revised accordingly.

A team of 14 enumerators (10 men and four women) were locally recruited from Lower and Middle Juba regions of Somalia. They participated in a two-day training workshop led by Oxfam staff. The second day of the workshop involved a piloting exercise, where a community in Garissa was identified. Following this exercise, the performance of each of the enumerators was reviewed individually before their appointments were confirmed.

The enumerator team was divided into two groups and sent to the 22 villages in the intervention areas and 16 villages in the comparison areas. The movement plan was created in consultation with the overall field supervisor to ensure that completed surveys were collected and reviewed at the end of every day. Feedback was provided regularly to all enumerators regarding their performance.

One key issue that could have affected the quality of data was the fact that Somalia is insecure and so training of interviewers from Somalia was done in Garissa, Kenya, and Oxfam staff were not involved in the first days of field work as is usually the case.

The full list of regions included in the Effectiveness Review, and the numbers of households interviewed in each, are shown in Table 4.1.

Table 4.1: Intervention and comparison groups sample sizes

Regions	Villages participating in the project	Households interviewed	Regions	Villages selected in comparison communities	Households interviewed
<i>Dobley</i>	3	32	<i>Dobley</i>	2	64
<i>Tabta</i>	3	27	<i>Delbuyo</i>	2	54
<i>Qoqani</i>	2	18	<i>Qoqani</i>	2	36
<i>Afmadow</i>	3	27	<i>Afmadow</i>	1	54
<i>Harbole</i>	2	17	<i>Mido</i>	1	34
<i>Hayo</i>	2	23	<i>Arbaqarso</i>	2	44
<i>Magar</i>	1	12	<i>Yaya</i>	1	24
<i>Godaya</i>	2	13	<i>Godaya</i>	1	26
<i>Gelef</i>	1	16	<i>Buriya</i>	1	32
<i>Hosingo</i>	1	21	<i>Waraq</i>	2	42
<i>Welmano</i>	2	14	<i>Degelema</i>	1	24
TOTAL	22	220		16	434

4.2 ANALYSIS

Households of project participants and non-participants 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 1. Some important differences were found between the project participants and comparison respondents. For example, household sizes in project areas were, on average, larger than those in the comparison areas (intervention mean was 6.914, comparison mean, 6.127), and the project participants were correspondingly less likely to have Koranic education. Household heads in the participant group had lower education levels compared with the comparison households. In participant communities, the survey team arrived with the names of the individually identified project participants, but in the comparison communities, this was not the case and the respondent was not necessarily the head of household, which could have contributed to education level differences. There were also significant differences between the household members in project areas and non-project areas in terms of those with no education, whether they grew any crops in 2009 and in their other livelihoods activities in 2009.

These differences that existed before the project have the potential to bias any comparison between the project and comparison groups. 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 was propensity-score matching (PSM). The full details of the matching procedure applied are described in Appendix 2. After matching, households in the project and comparison cells were well-balanced in terms of the recalled baseline. However, matches could not be found for all of the project participants interviewed: seven of the 220 project participant households 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 as they exclude a non-random minority.

All the results described in Section 5 of the report were also tested for robustness by estimating them with various alternative PSM models and linear or probit regression models. The alternative models produced results that are all similar (in size and in statistical significance) to those presented in the tables in this section.

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' pre-existing differences between the two groups – such as individuals' attitudes, motivation, skills or confidence – 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

This report is intended to be free from excessive technical jargon, with more detailed technical information being restricted to the appendices and footnotes. However, there are some statistical concepts that cannot be avoided in discussing the results. In this report, results will usually be stated as the average difference between households living in villages where the project was implemented (that is referred to as the 'intervention group') and the matched households in villages where the project was not implemented (named the 'comparison group'). 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 10 per cent, two asterisks (**) indicating a p-value of less than 5 per cent and one asterisk (*) indicating a p-value of less than 1 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 not considered to be statistically significant.

5.1 INTRODUCTION

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

The results are shown after correcting for the baseline and demographic differences found in Section 4.2 using a propensity-score matching procedure. The details of this procedure are described in Appendix 2. All outcomes discussed here have also been tested for robustness with alternative statistical models. In particular, as discussed in Section 4.2, alternative propensity-score matching models were created to take account of whether respondents recalled having been participating in the activities of the project in 2009. The alternative models produced results that are similar (in size and in statistical significance) to those presented in the tables in this section.

It is important to stress that the results presented in this section are average results across all those who participated in at least one of the interventions that were carried out during the implementation period in the 11 regions under the project up to 2013. Clearly it would be of interest to investigate the effects of the project at a more local level and for specific subgroups – but the small sample sizes available limit the potential for detecting any differences between these various subgroups.

One further point that was discussed in Section 3 should be remembered when considering the results presented in this section. 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 INVOLVEMENT IN PROJECT ACTIVITIES

Before considering outcome-level changes, it is interesting to consider the proportion of respondents who reported exposure to project-related interventions. This is an important consideration, firstly as it represents the analysis of the first step of the project's theory of change – i.e. are project participants being exposed to the intended livelihood-support interventions? Secondly, it is important to assess whether respondents in comparison areas also report receiving such support in their communities, as this may have an effect on the differences that may be detected between the intervention and comparison groups in the outcome measures reported subsequently. The following activities were considered for the intervention and comparison households from baseline to end line:

- Donation of agricultural equipment or tools
- Donation of seeds or fertiliser
- Donation of water pump
- Support in rehabilitating irrigation system
- Donation of donkey carts
- Donation of livestock
- Cash grant for household business
- Cash grant for other reason
- Cash for work
- Food aid

Figure 5.1: Proportion of respondents in the intervention and comparison communities reporting having received various interventions since 2009.

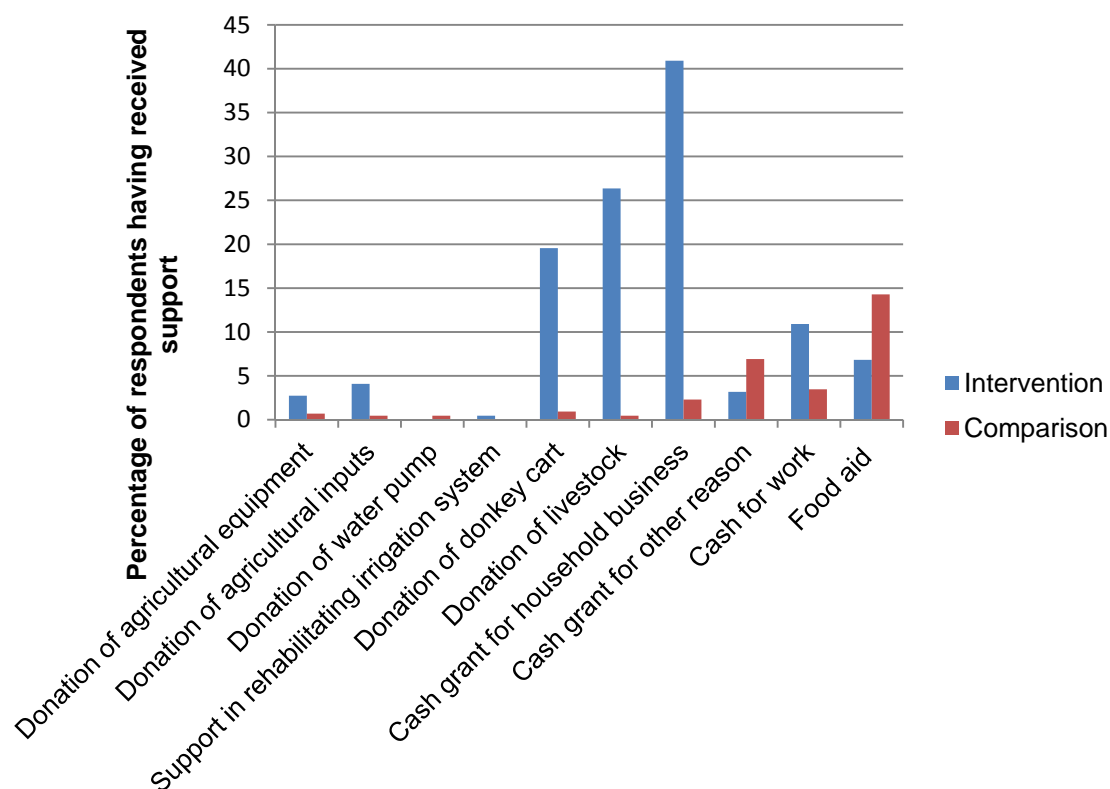


Figure 5.1 shows that since 2009 a considerable proportion of individuals in the intervention group reported having received donations of donkey carts, donations of livestock, cash grants for household business or cash for work. One important point to note from the figure is that people in comparison communities were more likely to receive food aid compared to the intervention areas over the period of the project, perhaps indicating their reduced resilience.

Table 5.1: Involvement in project activities

	1	2	3	4	5
	Respondent received donkey cart %	Respondent received donation of livestock %	Respondent received cash grant for household business %	Respondent received cash for work %	Respondent received food aid %
<i>Intervention group mean:</i>	20.3	26.9	41.5	10.4	6.6
<i>Comparison group mean:</i>	0.2	0.3	2.0	2.2	13.2
<i>Difference:</i>	20.1*** (2.8)	26.5*** (3.1)	39.6*** (3.5)	8.2*** (2.2)	-6.6** (2.7)
<i>Observations (intervention group):</i>	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647

Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; PSM estimates are bootstrapped with 1,000 repetitions and clustered by community.

It is important to note that an attempt was also made to check whether participation in the activities implemented under the project between the intervention and comparison groups was significantly different. Table 5.1 shows a comparison between those identified as participants (the intervention group) and those identified as non-participants (the comparison group) in terms of their participation in project activities. It should be noted that these figures make a comparison between outcomes after correcting (as far as possible) for the baseline and demographic differences between the intervention and comparison respondents, using the propensity-score matching process described in Appendix 2. Asterisks are used to indicate where the differences are statistically significant at least at the 10 per cent significance level. As is immediately apparent from the table, households that participated in the project are significantly different from the non-participants in terms of the main activities implemented from baseline to the end of the project.

5.3 LIVESTOCK OWNERSHIP AND SALES

One of the key questions in this Effectiveness Review was to find out if there has been a change in the number of animals owned and sold by households that participated in the project. The section below on livestock ownership and sales looks at the average numbers of each kind of livestock (cows, goats, sheep, herd camels, pack camels and donkeys) owned by project participants and non-participants in 2009 and in the previous 12 months. It aimed to identify the numbers of each kind of livestock owned by respondents and their households including those animals owned by their extended families. An attempt was also made to separate those animals owned by the respondents and their households excluding those owned by their extended families. The results are shown in Tables 5.2, 5.3, 5.4, 5.5 and 5.6. *The units in the tables below refer to number of animals.*

Table 5.2: Livestock sold in the past 12 months

	1	2	3	4	5	6
	Cows sold in the past 12 months	Goats sold in the past 12 months	Sheep sold in the past 12 months	Herd camels sold in past 12 months	Pack camels sold in past 12 months	Donkeys sold in past 12 months
<i>Intervention group mean:</i>	0.646	1.821	0.208	0.090	0.028	0.028
<i>Comparison group mean:</i>	0.504	1.865	0.360	0.067	0.044	0.040
<i>Difference:</i>	0.142 (0.198)	-0.044 (0.628)	-0.152 (0.119)	0.023 (0.075)	-0.016 (0.033)	-0.012 (0.021)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.3: Livestock owned by household and extended family in the past 12 months

	1	2	3	4	5	6
	Cows owned by family now	Goats owned by family now	Sheep owned by family now	Herd camels owned by family now	Pack camels owned by family now	Donkeys owned by family now
<i>Intervention group mean:</i>	1.571	5.854	1.080	0.090	0.028	0.066
<i>Comparison group mean:</i>	1.428	4.473	1.276	0.224	0.027	0.049
<i>Difference:</i>	0.143 (0.381)	1.381* (0.833)	-0.196 (0.509)	-0.134 (0.112)	0.001 (0.029)	0.017 (0.026)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.4: Number of animals that belonged to respondent and her household members in the past 12 months

	1	2	3	4	5	6
	Number of cows owned by respondent and household	Number of goats owned by respondent and household	Number of sheep owned by respondent and household	Number of herd camels owned by respondent and household	Number of pack camels owned by respondent and household	Number of donkeys owned by respondent and household
<i>Intervention group mean:</i>	1.519	5.825	1.118	0.075	0.019	0.071
<i>Comparison group mean:</i>	1.406	3.912	0.647	0.171	0.011	0.035
<i>Difference:</i>	0.113 (0.373)	1.913** (0.821)	0.471** (0.235)	-0.096 (0.099)	0.008 (0.018)	0.036 (0.024)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.2 shows the differences between project participants and non-participants in terms of the livestock they sold in the past 12 months. The respondents were asked to state the number of cows, goats, sheep, herd camels and pack camels their households sold in the past 12 months. There was no significant difference in the average number of each kind of livestock sold between the intervention and the comparison communities.

Table 5.3 shows the differences between participants and non-participants in terms of each kind of livestock they owned in the past 12 months. Respondents were asked to approximate how many of the animal types the household and extended family owned

in the past 12 months. As can be seen from the table, there were no significant differences between the intervention group and the comparison communities regarding the number of each kind of animal owned by the households and their extended families. However, there was a little evidence showing that participant households and their extended families owned more goats, on average, than non-participants.

Table 5.4 shows the differences between the participants and non-participants in terms of share of animals that belong to the respondent and her household members. The respondents were asked to state how many of each kind of livestock they and their household members owned excluding those animals owned by their extended families. Columns 2 and 3 of the table show that there were significant differences in the number of goats and sheep owned by respondents and household members in participant households compared with non-participants. Respondents and their household members in intervention areas owned about two more goats and 50 per cent more sheep, on average, than their counterparts in the comparison areas. There were no significant differences between the participants and non-participants in terms of ownership of cows, herd camels, pack camels and donkeys. It is likely that the extended families were not in the project areas and so did not benefit from restocking, which was one of the activities undertaken by the project and hence no statistically significant differences were observed in Table 5.3.

Table 5.5: Animals owned by household and extended family in 2009

	1	2	3	4	5	6
	Cows owned by family in 2009	Goats owned by family in 2009	Sheep owned by family in 2009	Herd camels owned by family in 2009	Pack camels owned by family in 2009	Donkeys owned by family in 2009
<i>Intervention group mean:</i>	1.363	2.175	0.349	0.057	0.028	0.024
<i>Comparison group mean:</i>	1.613	3.394	1.381	0.296	0.005	0.035
<i>Difference:</i>	-0.250 (0.609)	-1.219* (0.624)	-1.032*** (0.361)	-0.239 (0.148)	0.023 (0.018)	-0.011 (0.019)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated after matching.

Table 5.6: Number of animals owned by respondent and household members in 2009

	1	2	3	4	5	6
	Number of cows owned by respondent and household in 2009	Number of goats owned by respondent and household in 2009	Number of sheep owned by respondent and household in 2009	Number of herd camels owned by respondent and household in 2009	Number of pack camels owned by respondent and household in 2009	Number of donkeys owned by respondent and household in 2009
<i>Intervention group mean:</i>	1.236	1.854	0.307	0.038	0.019	0.019
<i>Comparison group mean:</i>	1.708	3.420	1.399	0.286	0.020	0.037
<i>Difference:</i>	-0.472 (0.697)	-1.566** (0.634)	-1.092*** (0.387)	-0.248** (0.116)	-0.001 (0.019)	-0.018 (0.017)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.5 shows the differences between project participants and non-participants in terms of share of livestock owned by their households and extended families in 2009. Respondents were asked to approximate the number of each kind of livestock their households and extended families owned in 2009. On average, households and their extended families in comparison communities had significantly higher numbers of goats and sheep compared with households in intervention areas in 2009 when the project started.

Table 5.6 shows the differences between the participants and non-participants regarding the number of each kind of livestock owned by the respondents and their households in 2009. The respondents were asked to state the number of each kind of livestock they and their households owned, excluding the animals owned by their extended families. Respondents and their households in comparison areas owned, on average, a higher numbers of goats, sheep and herd camels than respondents who were later on selected to participate in the project.

One important point that should be noted is that respondents and their households that were selected to participate in the project had significantly lower numbers of goats and sheep on average in 2009. After becoming beneficiaries of the project, they had on average higher numbers of goats and sheep at the end of the project compared with those respondents that did not take part in the activities of the project. This observation is noted in Table 5.4. The households that participated in the project benefited from restocking of livestock, which was a major intervention in the project areas, indicated also in Table 5.1.

5.4 PARTICIPATION IN COMMUNITY GROUPS

Another question that this Effectiveness Review sought to answer was whether household members participated in community groups and, more specifically, whether women participated in these groups. A section of the questionnaire sought to identify whether household members participated in community groups at the time of the survey or in 2009. The following groups were included in the list of community groups:

- Village elders
- Trade associations/producers' associations
- Committees for managing, implementing or monitoring projects
- Savings/credit group
- Women's group
- Youth group
- Religious group or other group

Respondents were asked whether they or any member of their household regularly participate in meetings of any of the above groups or whether they participated in such group meetings in 2009. They were also asked to specify whether females, males or both males and females regularly participate in the group meetings

As can be seen in Table 5.7 column 1, there was a 19.4 percentage point increase in the average number of household members participating in group meetings from the intervention group compared with household members from the comparison group. Column 3 of the table reveal that on average, there was a 12.8 percentage point increase in the number of females from the participant households compared with non-participants with regard to participation in group meetings. Column 2 of the table also reveals that male members of households from the areas where the project was implemented were slightly more likely to participate in group meetings compared with their male counterparts in areas that were not selected for project implementation.

Columns 4 and 5 of the table show that there was no significant difference between household members from participants and non-participants in terms of participation in group meetings in 2009. Participation in group meetings by household members in project areas can be attributed to the committees that were formed to manage the project from its inception to closure such as Project Accountability Committee (PAC), Project Implementation Committee (PIC) and Project Monitoring Committee (PMC).

Table 5.7: Participation in community groups

	1	2	3	4	5
	Respondent or any household member regularly participate in group meetings %	Male members of household regularly participate in group meetings %	Female members of household regularly participate in group meetings %	Both male and female members regularly participate in group meetings %	Respondent or any household member participated in group meetings in 2009 %
<i>Intervention group mean:</i>	42.9	24.5	18.4	2.4	22.6
<i>Comparison group mean:</i>	23.5	18.1	5.6	2.3	16.9
<i>Difference:</i>	19.4*** (4.3)	6.4* (3.9)	12.8*** (3.1)	0.1 (1.6)	5.7 (3.9)
<i>Observations (intervention group):</i>	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

5.5 INCOME FROM LIVESTOCK AND MILK SALES

One of the key activities of the project was restocking of livestock. The respondents were asked whether their household incomes from the sale of milk had increased, decreased or remained constant since 2009. The respondents were also asked whether their household incomes from the sale of livestock had increased, decreased or remained constant since 2009. Table 5.2 investigated the impact of the two binary variables in the intervention areas compared with the comparison communities using Kernel Propensity Score Matching.

Table 5.8: Income from Livestock and Milk sales

	1	2	3
	Increased income from Milk sales %	Increased income from Livestock sales %	Recovery of Livestock herds (No. of livestock)
<i>Intervention group</i>	22.2	22.2	8.75
<i>Comparison group</i>	6.3	5.2	7.602
<i>Difference:</i>	15.9*** (3.2)	17.0*** (3.1)	1.148 (1.180)
<i>Observations (intervention group):</i>	213	213	213
<i>Observations (total):</i>	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Column 2 of the table shows that there was an on average 15.9 percentage point increase in the number of participant households reporting increased income from milk sales compared with non-participants. Similarly, on average there was a 17 percentage point increase in the number of participant households reporting increased income from livestock sales compared with non-participants. It should be noted that this was a subjective measure of income derived from these sources. Households in intervention areas were given livestock herds during the project and this activity could have contributed to this positive impact. However, the finding on perceived increase in livestock sales in the participant group contradicts the quantitative measure on livestock sales. According to this measure, there was no significant difference between the households that participated in the project and non-participants. This is expected since measures based on perception may sometimes be biased.

5.6 RESPONSE TO THE 2011 DROUGHT

There was prolonged drought in Middle and Lower regions of Juba in Somalia in 2011 where the project was implemented. A section of the questionnaire sought to examine how households responded to this drought in terms of coping strategies. The following strategies were listed:

- Reducing food consumption
- Receiving transfers of money from outside the community
- Sending family members to stay with relatives
- Loaning animals
- Selling livestock in order to buy food
- Selling other assets in order to buy food
- Migrating to urban areas in order to look for work
- Migrating to refugee camps
- Migrating overseas
- Cutting wood; burning or selling charcoal
- Borrowing money at a high interest rate
- Removing one or more children from school
- Seeking alms (Zakat)

The respondents were asked whether they took any of the above actions during the 2011 drought. If they took any of the above actions, they were further asked whether they take it regularly in most years or it was only needed during the 2011 drought.

Table 5.9: Response to the 2011 drought

	1	2	3
	Households took specific actions during 2011 drought (see text above) %	Households take the specified actions regularly in most years %	Households took the specified actions only during the 2011 drought %
<i>Intervention group mean:</i>	86.3	37.3	37.3
<i>Comparison group mean:</i>	87.8	43.5	43.5
<i>Difference:</i>	-1.5 (3.2)	-6.2 (4.7)	-6.2 (4.7)
<i>Observations (intervention group):</i>	213	213	213
<i>Observations (total):</i>	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.9 shows a comparison between the project participants and non-participants in terms of the actions they took during the 2011 drought. The results indicate that a considerable proportion of respondents in participant households and non-participant households took the stated actions in order to cope with the drought (column 1). Column 2 shows that a proportion of households in both the intervention and comparison areas that took the actions regularly, in most years were below average. Similarly, column 3 also indicates that the proportion of households in both the intervention and comparison areas that took the specified actions only during the 2011 drought were equally below average. However, there was no significant difference between the proportions of participants and non-participants in terms of actions taken to cope with the drought. Since drought is rampant in these areas, this information may be important, especially in the second phase of this project, for devising ways of increasing resilience.

5.7 USE OF DONKEY CARTS FOR INCOME GENERATION

One other question the Effectiveness Review sought to answer was whether the provision of donkey carts had an impact on project participants. The questionnaire asked whether the respondent or other members of the household received a donkey cart at any time since 2009. Table 5.10 investigated the impact on intervention and comparison households selected using kernel propensity-score matching. Results suggest that there was a 5.9 percentage point increase, on average, in the number of households in intervention areas reporting having received donkey carts for income generation, compared with the comparison households.

Table 5.10: Use of donkey carts for income generation

	Use of donkey carts for income generation
	%
<i>Intervention group mean:</i>	9.4
<i>Comparison group mean:</i>	3.5
<i>Difference:</i>	5.9*** (2.5)
<i>Observations (intervention group):</i>	213
<i>Observations (total):</i>	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

It is also important to remember that a higher proportion of project participants (20.3 per cent) received donkey carts compared with only 0.2 per cent of non-participants as reported in Table 5.1. However, on average, only a small proportion of project participants are using donkey carts for income generation compared to none participants. The donkey carts were used to generate income through provision of transport services to the local community members, such as transport of water from water points to the community and transporting other goods to markets at a cost.

5.8 INCREASED REVENUE FROM INCOME GENERATING ACTIVITIES

One of the activities carried out by the project was the provision of cash for income generation activities. The income generating activities that were supported by the project included butchers, selling clothes, selling tea, small shops, bars or restaurants, making or selling furniture or other small household businesses. To assess the impact of this activity, respondents were asked to approximate the total revenues obtained from household businesses in a typical month in the past 12 months. They were also asked to approximate the total revenue obtained from the businesses in a typical month in 2009.

Table 5.11 investigated the impact in the intervention and comparison households using kernel propensity score matching.

Table 5.11: Increased income from Income Generating Activities (IGA)

	1	2	3	4
	Total revenue from IGA in a typical month over the past year (Shs)	Total revenue from IGA in a typical month over the past year (Logarithms of Shs)	Total revenue from IGA in a typical month in 2009 (Shs)	Total revenue from IGA in a typical month in 2009 (Logarithm of Shs)
<i>Intervention group mean:</i>	60018.344	6.855	12092.066	6.032
<i>Comparison group</i>	39014.066	7.265	11434.866	6.826
<i>Difference:</i>	21004.278 (17431.491)	-0.41 (0.561)	657.2 (9271.705)	-0.794 (0.694)
<i>Observations (intervention group):</i>	213	213	213	213
<i>Observations (total):</i>	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated after matching.

The findings reveal that project participants, on average, obtained almost twice the revenue obtained by the non-participants in a typical month in the previous 12 months. It is important to note in column 2 of the table that the revenues obtained by the participants and non-participants, on average, were almost the same in 2009. Even though the average difference in revenues between the two groups in the previous 12 months is not statistically significant, there seems to be a bigger increase in revenues in the households that participated in the project. The revenues were also transformed into logarithms, but still there was no statistically significant difference between the two groups

The non significance of the average difference in revenues between the participant households and non-participants is surprising given that in Table 5.1, only about 2.2 per cent of non-project participants reported having received cash for household businesses, against 41.7 per cent for project participants. It is likely that most households in the intervention group, having received the money, failed to invest it in household businesses. From the list of project activities carried out, it is clear that the project participants did not receive training on businesses management and this could also contribute to lower incomes from these investments. Indeed, this presents a good opportunity for the second phase of the project whose baseline has just been completed.

5.9 AGRICULTURAL PRODUCTION AND SALES

We decided to look at the quantity of agricultural production and sales even though agricultural activities were carried on a small scale and with few households, as indicated in Table 5.1.

The questionnaire asked respondents to indicate whether or not they produced a particular agricultural product in the last 12 months from a list of six different crops usually grown in the area. If they responded positively the respondents were asked to estimate the total amount produced, and the quantity of each crop produced.

Table 5.12 investigates the quantity of agricultural production. It provides a comparison of the mean of the total quantity of produce and the quantity of each agricultural crop produced in the previous 12 months between households in intervention communities and comparison households selected using kernel propensity-score matching.

Results suggest that there was no significant difference in the total quantity of all crops produced or the quantities of individual crops produced between the intervention and comparison households. This result is not surprising since few households were involved in agricultural activities.

The next step was to check whether there were differences in the total quantity of crop sales put together as well as quantity of sales of each produce. Respondents were asked to approximate the total quantity of sales and the quantity of each crop sold in the past 12 months.

Table 5.13 provides no evidence to show that households in intervention communities were selling greater amount of total agricultural produce than households in comparison communities. There is also no evidence to show that the sale of each kind of crop was significantly different between the participant and non-participant households. This result is also expected since a smaller quantity of crops were produced to meet household needs and, in fact, as indicated in table 5.1, these households reported having been receiving food aid since 2009.

Table 5.12: Quantity of agricultural production

	1	2	3	4	5	6
	Quantity of crops produced in the last 12 months (deir season) (Quintals)	Quantity of beans produced in the last 12 months (Quintals)	Quantity of maize produced in the last 12 months (Quintals)	Quantity of millet produced in the last 12 months (Quintals)	Quantity of simsim produced in the last 12 months (Quintals)	Quantity of sorghum produced in the last 12 months (Quintals)
<i>Intervention group mean:</i>	34.623	5.967	20.00	0.118	5.189	3.349
<i>Comparison group mean:</i>	25.667	3.690	14.753	0.211	6.183	0.772
<i>Difference:</i>	8.956 (13.641)	2.277 (3.653)	5.247 (8.307)	-0.093 (0.241)	-0.994 (3.285)	2.577 (3.530)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.13: Quantity of crops/agricultural products sold

	1	2	3	4	5
	Quantity of crops sold in the last 12 months (deir season) (Quintals)	Quantity of beans sold in the last 12 months (Quintals)	Quantity of maize sold in the last 12 months (Quintals)	Quantity of simsim sold in the last 12 months (Quintals)	Quantity of sorghum sold in the last 12 months (Quintals)
<i>Intervention group mean:</i>	14.104	1.274	9.104	3.255	0.472
<i>Comparison group mean:</i>	18.555	1.853	11.385	4.717	0.572
<i>Difference:</i>	-4.451 (7.676)	-0.579 (0.985)	-2.281 (5.868)	-1.462 (2.089)	-0.100 (0.762)
<i>Observations (intervention group):</i>	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

5.10 COMMUNITY ACTIONS

A section of the questionnaire asked if respondents were aware of some specific new initiatives having been carried out in the community in the previous 12 months. The following initiatives were listed for the respondents:

- Opening or de-silting canals, new rainwater harvesting
- Setting up or rehabilitating a Koranic school

- Setting up garbage collection
- Communal donation for someone who has suffered misfortune
- Communal security initiative
- Environmental improvements
- Bush clearing for a road

The respondents were also asked questions about whether the initiatives were from the local leaders, community members or an external organisation. The questionnaire also sought to find out from the respondents whether they or their household members were involved in planning or monitoring these initiatives.

Table 5.14, column 1 indicates that 47 per cent and 34 per cent of households in intervention and comparison areas, respectively, are aware of new initiatives carried out in their communities in the previous 12 months. On average, about 13 percentage points more households in intervention areas reported being aware of new initiatives than comparison households (column 1).

As to whether the initiative was from local leaders, other community members or an external organisation, the analysis does not find significant differences between the project participants and non-participants (columns 2, 3 and 4).

Columns 5, 6 and 7 shows the involvement of male, female and both male and female members of households respectively in monitoring the initiatives. As can be seen from the table, there are no gender differences between the intervention and comparison areas with regard to monitoring of new initiatives in these communities.

Table 5.14: Awareness of community initiatives and responsibilities.

	1	2	3	4	5	6	7
	Aware of new initiatives carried out in community in past 12 months %	Initiative taken by local leaders %	Initiative taken by community members %	Initiative taken by external organisation %	Male household members involved in monitoring initiative %	Female household members involved in monitoring initiative %	Male and female household members involved in monitoring initiative %
<i>Intervention group mean:</i>	47.4	24.4	28.6	1.9	18.3	7.5	18.3
<i>Comparison group mean:</i>	34.1	19.3	26.5	2.2	13.9	5.8	14.9
<i>Difference:</i>	13.3*** (4.70)	5.1 (4.10)	2.10 (4.3)	-0.30 (1.30)	4.40 (3.70)	1.7 (2.5)	3.4 (3.4)
<i>Observations (intervention group):</i>	213	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

At the initial stages of the implementation of this project, various committees were formed, such as the Project Accountability Committee (PAC), Project Implementation Committee (PIC) and Project Monitoring Committee (PMC). It appears that the Project Monitoring Committee has not sensitised community members on project monitoring to

ensure maximum benefits (columns 5, 6 and 7). It is clear that a good proportion of respondents in both groups reported being aware of new initiatives in their communities. It therefore appears that the local communities may not be aware of who is behind these initiatives since there are no significant differences between participants and non-participants when asked about who has initiated them (columns 2, 3 and 4).

One important point to note here is that the questionnaire did not ask who funded these new initiatives. It is therefore difficult to argue that the significant difference noted in column 1 of Table 5.14 was an impact of this project.

5.11 COMMUNITY INVOLVEMENT

The involvement of community members, and women in particular, in community-based projects was further investigated in this Effectiveness Review. Respondents were provided with two seemingly opposite statements and asked to state which of the two statements they agreed with more. The following statements were presented to the respondents.

- If an organisation wants to implement a project in this community, we will accept whatever they bring: we don't want to question their plans, or
 - Projects being implemented in this area have been improved when local people have provided feedback on their plans.
-
- People in this community often discuss with outside organisations about how to improve the projects they are implementing, or
 - People in this community do not have any influence on projects that are implemented in this area.
-
- If a new project is being started in this community, you or others in your household will be able to ask questions about how it really benefits the community, or
 - There is little or no opportunity for you or other members of your household to ask questions about new projects in this community.
-
- The quality of projects that NGOs/aid organisations are implementing in this area is generally good, or
 - NGOs/aid organisations are doing a lot projects that benefit only a few people.
-
- Women's participation in community groups and initiatives is just as important as men's participation, or
 - Participation in community groups and initiatives is a matter for men, not for women.
-
- A woman should always seek permission from her husband before participating in community groups or activities, or
 - A woman is free to decide for herself which community groups or activities she can participate in.
-
- Women now take a more active role in community initiatives than they used to, or
 - Women do not participate much in community affairs in this community.

- It is very difficult for women to voice their opinion in meetings of community groups or committees, or
- If a woman wants to speak in a meeting of a community group or committee, people would give her the opportunity to do so.

The results are presented in Tables 5.15, 5.16 and 5.17 below.

Table 5.15: Community members' involvement in project management.

	1	2	3	4	5	6
	Community does not question projects implemented %	Community gives feedback on project plans %	Community discusses with external organisations on how to improve projects %	Community does not have influence on projects implemented %	Community asks questions on how new projects benefit them %	No opportunity to ask questions on new project benefits %
<i>Intervention group mean:</i>	36.6	63.4	63.4	36.6	65.7	34.3
<i>Comparison group mean:</i>	42.9	56.8	55.0	45.0	51.5	48.3
<i>Difference:</i>	-6.3 (4.6)	6.6 (4.6)	8.40* (4.5)	-8.4* (4.5)	14.2*** (4.7)	-14.0*** (4.7)
<i>Observations (intervention group):</i>	213	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.16: Perception of project benefits and aspects of women's empowerment

	1	2	3	4	5
	Quality of projects implemented is generally good %	NGO projects only benefit a few people %	Women's participation in groups is as good as men's %	Participation in groups is for men not women %	Women always seek permission from husbands to participate in activities %
<i>Intervention group mean:</i>	62.4	37.1	58.7	40.8	67.1
<i>Comparison group mean:</i>	61.7	38.0	60.6	39.0	71.0
<i>Difference:</i>	0.7 (4.6)	-0.90 (4.7)	-1.9 (4.4)	1.8 (4.4)	-3.90 (4.4)
<i>Observations (intervention group):</i>	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.17: Women’s ability to speak and make decisions in community initiatives

	1	2	3	4	5
	A woman is free to decide for herself which group to participate in %	Women now take a more active role in community initiative than they used to %	Women do not participate much in community affairs in this community %	It is difficult for women to voice their opinion in community meetings %	Women are given opportunity to speak in community meetings %
<i>Intervention group mean:</i>	31.9	59.6	39.9	47.4	49.8
<i>Comparison group mean:</i>	29.0	56.4	43.2	49.3	49.2
<i>Difference:</i>	2.9 (4.40)	3.2 (4.7)	-3.3 (4.7)	-1.9 (4.7)	0.6 (4.7)
<i>Observations (intervention group):</i>	213	213	213	213	213
<i>Observations (total):</i>	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

The results of community involvement in project management are shown in Table 5.15. Column 1 indicates that lower proportions of households in both intervention and project areas do not question projects implemented in the community. Columns 2 and 3 indicate that a good proportion of households in both groups give feedback on project plans and discuss with external organisations on how to improve projects respectively with modest significant difference in the latter.

Column 4 of the table shows that a slightly higher proportion of households in the comparison areas do not have influence on projects implemented compared with the intervention households. However, on average, there was a 14 percentage point increase in the number of participant households asking questions on how new projects benefit them compared with non-participant households (column 5).

It is important to note that, on average, there was a 14 percentage point increase in the number of non-participant households reporting having no opportunity to ask questions on new project benefits compared with their counterparts in the intervention areas (column 6). This is in agreement with the findings in column 5 of the table. This may be as a result of the committees that were formed at the initiation of the project. These committees have members drawn from the villages where the project was implemented and, as observed in Table 5.17, respondents and household members – and specifically women – in intervention areas participate in community meetings more than members from the comparison group.

Table 5.16 shows the perception of project benefits and aspects of women’s participation. It looks at perceptions about the quality of projects implemented, whether NGO projects only benefit a few people, whether women’s participation in groups is as good as men’s, whether participation in groups is for men and not women, and whether women always seek permission from their husbands to participate in activities. There

were no significant differences regarding these perceptions between participants and non-participants. One point to note in column 5 of the table is that a considerable proportion of respondents in both the intervention and comparison areas contend that women always seek permission from their husbands to participate in activities which may indicate lower women empowerment, but again may also be related to the culture of the community.

Finally, Table 5.17 shows perceptions regarding women's ability to speak and make decisions in community initiatives. It looks at perceptions of whether women are free to decide for themselves which group to participate in; whether women now take a more active role in community initiative than they use to; whether women do not participate much in community affairs in the community; whether it is difficult for women to voice their opinions in community meetings and whether women are given opportunity to speak in community meetings. The findings reveal that there are no significant differences regarding these perceptions between the participants and non-participants. It must be noted that this was not a project focusing on women's empowerment, but this was investigated here since women empowerment may be critical to the success, or otherwise, of development projects.

5.12 OVERALL HOUSEHOLD INCOME

Measuring household income directly is problematic: self-reported measures of total income are generally regarded as unreliable, given the wide variety of activities that households engage in to generate income. For this reason, the survey did not attempt to collect data on total household income directly. However, there is a widely recognised and strong association between household income and consumption. The Effectiveness Review therefore followed common practice in micro-level economic analysis, by considering the value of household consumption as a proxy measure of income.

To that end, respondents were asked to provide detailed information about their recent expenditure on both food and non-food items. Firstly, the respondents were asked what types and quantities of food they had consumed over the previous seven-day period. The quantities of each food item consumed were then converted into a monetary value. This was done by asking the respondent how much was paid for the food item – or if the food item was from the household's own production, how much it would be worth if it was purchased from the local market. The respondents were also asked how much they had spent on non-food items over the past seven days, past month, past three months, or past 12 months, as appropriate to the particular item.

The household expenditure measure was calculated by converting each of the expenditure types into a per-day figure and adding them together. This figure was then divided by a factor representing household size, to generate a per-day, per-person expenditure figure. The expenditure variable has been 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 Table 5.18.

It can be seen in column 1 of the table that the value of food consumed within the households of project participants and non-participants was not significantly different. Even the logarithmic transformations did not show a significant difference (column 2).

Columns 3 and 4 show comparisons corresponding to those already discussed in columns 1 and 2, but this time with non-food expenditure included. Similarly, no

significant differences were noticed even after logarithmic transformation. Column 5 of the table refers to the Global Livelihoods Indicator.

Table 5.18: Household consumption

	1	2	3	4	5
	Food consumption per adult equivalent per day (Pesos)	Food consumption per adult equivalent per day (Logarithm of pesos)	Total household consumption per adult equivalent per day (Pesos)	Total household consumption per adult equivalent per day (Logarithm of pesos) (New Global Indicator)	Old Global Indicator for livelihoods support
<i>Intervention group mean:</i>	25631.824	9.897	32815.078	10.189	0.479
<i>Comparison group mean:</i>	28236.288	9.950	35197.403	10.289	0.499
<i>Difference:</i>	-2604.464 (2581.191)	-0.053 (0.069)	-2382.325 (2882.923)	-0.1 (0.062)	-0.020 (0.048)
<i>Observations (intervention group):</i>	213	213	213	213	213
<i>Observation(total):</i>	647	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table 5.18 shows the comparison of expenditure between supported households and comparison households, both before and after logarithmic transformation. On average, the difference between the intervention group and comparison group with regard to total household consumption per adult equivalent per day was not statistically significant different from zero. This measure also represents the new Oxfam GB's 'Global Indicator' for livelihoods Effectiveness Reviews.

In the past years this indicator was measured as the proportion of the samples whose daily consumption exceeds the median of the unmatched comparison sample. In order to provide some continuity with previous Effectiveness Reviews the fifth column in Table 5.18 provides estimates also for the old measure. Some 47.9 per cent of the households in the intervention sample had expenditures exceeding the critical value while 49.9 per cent of the matched comparison sample did. The difference was not statistically significant different from zero.

5.13 HOUSEHOLD ASSET WEALTH

An alternative way to consider income is to investigate asset ownership. For this reason, respondents were asked about their ownership of various types of household goods, livestock and productive assets, as well as about the condition of their housing. These data were used to create a wealth index using Cronbach's alpha.² A total of 31 assets and other wealth indicators were used to construct the household wealth index, with their inter-item correlations. The wealth indices were then created through applying principal component analysis (PCA) to the selected indicators. PCA is a data reduction technique that narrows in on the variation in household asset ownership,

which is assumed to represent wealth status: the more an asset type is correlated with this variation, the more weight it is given.

To examine changes in wealth indicators, the data about ownership of particular assets and housing characteristics were aggregated into a single index of material wealth. To do this, they were first checked to see which of the indicators appeared to be good indicators of wealth. If each of the 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. Items that had low correlations or negative correlations with the others were therefore not included in the index. In particular, ownership of most types of livestock was not found to be correlated with ownership of other assets, nor was ownership of a motorbike, ownership of a car, or some other minor characteristics. These variables were therefore not used in the construction of the wealth index.

PCA was used to produce the indices of overall material wealth. The resulting index enables the relative wealth status of the households to be compared.

Table 5.19: Wealth index

	1	2
	Wealth index as at date of survey	Change in wealth index between 2009 and the date of the survey (scale from -1 to 1)
<i>Intervention group mean:</i>	0.155	0.376
<i>Comparison group mean:</i>	0.122	-0.049
<i>Difference:</i>	0.033** (0.013)	0.425*** (0.115)
<i>Observations (intervention group):</i>	213	213
<i>Observations (total):</i>	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Two separate wealth indices were created. The wealth index based on the data recalled from 2009 is the measure shown in the table of summary statistics in Appendix 1 that 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. The second index allows the wealth indicators at the time of the survey to be compared with those from 2009.

Column 1 shows a comparison of the households of project participants and non-participants in terms of the wealth index as at date of survey. It can be seen that the difference between the participants and non-participants in terms of wealth index was statistically significantly different from zero.

Table 5.19 column 2 shows the figures for the change in wealth index for project and comparison households between 2009 and the date of the survey. The change in wealth index is scaled so that a household that saw no changes in wealth indicators has a score of zero, while the household that saw the greatest change in wealth indicators has a score of 1. (The household that experienced the largest *negative* change in wealth index has a score of approximately -0.9 on this scale.) It can be seen that project households on average experienced improvements in their wealth

indicators since 2009 (that is, the changes in wealth index were positive). The comparison households did not experience improvement in their wealth indicators since 2009 (that is, the changes in wealth index were negative).

It appears, then, the wealth indicators of project participant households increased between 2009 and the time of the survey at a greater rate than those of non-participant households.

The difference in the wealth index between the intervention groups may be explained by looking at some of the outcome variables which are proxy to wealth index. It can be seen from the earlier results that the intervention households had increased income from milk sales, use of donkey carts for income generation, increase in the average number of goats and sheep owned by households. They were given cash for household businesses and cash for work. The incomes derived from these sources could probably be used to acquire more household goods and assets. This result is also consistent with different estimation models presented in Appendix 3.

6 CONCLUSIONS

6.1 CONCLUSIONS

This Effectiveness Review found evidence that the project 'Community Driven Livelihood and Food Security Initiatives (CLFSI) in Lower and Middle Juba Regions of South Somalia' has positively affected supported households in several important livelihood characteristics.

The review found that households that participated in the project had, on average, increased the number of goats owned by two and the number of sheep by about 50 per cent compared with households that did not participate in the project. This was due to restocking of livestock which was a key activity in the project areas.

Household members' participation in group meetings increased by about 20 percentage points on average while women's participation in group meetings increased by about 12 percentage points in intervention households compared with the comparison households. This was as a result of the committees formed to steer the project such as Project Accountability Committees, Project Implementation Committees and Project Monitoring Committees that incorporated members from the various villages that participated in the project as well as sensitisation meetings that were carried out.

In the same vein there was a 14 percentage point increase in the number of participant household members asking questions on how new project initiatives in the community can benefit them compared with non-participants. This is important because they can prioritise project activities based on their local needs and context, which may ultimately lead to the success of the projects implemented.

The intervention households also reported having received higher income from milk sales. On average, there was a 15.9 percentage point increase in the number of participant households reporting higher income from milk sales compared with non-participants. It should however be noted that this was a subjective measure of income derived from milk sales. Respondents were asked whether their income from milk and livestock sales had changed. Similarly, on average, and according to this subjective measure, there was a 17 percentage point increase in the number of households in

intervention areas reporting increased income from livestock sales compared with households in comparison areas.

Another key question was whether the provision of donkey carts led to an increase in incomes of households that participated in the project. There was a six percentage point increase in the number of participant households reporting an increase in income from the use of donkey carts for income generation compared with non-participants.

Detailed data about household assets and livestock also revealed that the wealth index of households that participated in the project increased significantly from baseline compared with households that did not participate in the project. A comparison of the wealth index of non-participants both at baseline and end line reveal that their wealth index remained almost constant. It is likely that the cash for household businesses and the increased income obtained from milk sales, and donkey carts and cash for work could have led to more disposable income for these households to acquire more household goods and assets compared to the households that did not participate in the project.

Finally, this analysis fails to identify evidence supporting an increase in overall household income in intervention households. Indicators of total household expenditures (New Global Indicator for livelihoods) and daily per capita food consumption are not statistically different for intervention and comparison households.

6.2 PROGRAMME LEARNING CONSIDERATIONS

Project committees should be strengthened to play a bigger role in planning, implementation and monitoring of community livelihoods programmes.

The critical role played by the committees formed to steer the project forward contributed to positive outcomes. The committees were responsible for the identification of activities to be carried out and selection of beneficiaries based on poverty and vulnerability. In addition, they took part in implementation, monitoring of the project and accountability issues. They undertook community mobilization for increased participation of community members in project activities. There is evidence from this Effectiveness Review showing that the Project Implementation, Monitoring and Accountability Committees contributed to increased participation and involvement of community members, especially women, in project activities. This unique feature of the project should be encouraged in future implementation strategies of projects of this nature.

Training component inbuilt in a business model for Income Generating Activities should be considered.

Capacity building of beneficiaries with regard to small household businesses should be a prerequisite before such activities are undertaken. One lesson that can be learnt from this Effectiveness Review is that for Income Generating Activities to succeed as a business model there should be a component of training on the range of businesses available to the recipients prior to the distribution of funds. In this project, no training on business skills was carried out with the beneficiaries before roll-out of the activity. Indeed, there is evidence from this Effectiveness Review that household businesses did not have an impact on the beneficiaries, even though it was the most important activity and accounted for a significant portion of the project budget. Future projects dealing with pastoralist communities should disburse funds to those already involved in household businesses and ensure training of beneficiaries.

Consider Continuous Monitoring System to ensure detection of implementation challenges during the course of the project.

Monitoring is crucial for project implementation since it provides programme staff with the opportunity to observe whether activities are being implemented as planned. Without monitoring, it is difficult to gain an understanding of what happens during project implementation. It was revealed during discussions with project staff that beneficiaries of funds for household businesses were not monitored to ensure that they implemented the activities for which the funds were provided. A monitoring plan that provides a framework on what is to be monitored, the establishment of the frequency of monitoring visits, and how monitoring should be done, need to be developed at the outset for future implementation of such projects.

There is a need to further investigate the effect of cultural dynamics on the success of livelihoods interventions in this community.

There is evidence from this Effectiveness Review that the wealth status of beneficiaries, measured using household assets and livestock, improved over the period of implementation. It is possible that the project participants acquired additional livestock with funds meant for household businesses, since as pastoralists they are more inclined towards rearing animals than engaging in small businesses, which was a focus of this project. A deeper understanding of culture and traditions can help programme staff in similar projects in the future in guiding the community with regard to choice of activities to be implemented.

APPENDIX 1: BASELINE STATISTICS BEFORE MATCHING

Descr stats					
	N	Intervention mean	Comparison mean	Difference	t-statistic
Education of household head	654	0.938	0.600	0.338***	0.069
Members with no education	654	0.253	0.391	-0.137***	0.038
Members – Koranic education	654	0.696	0.568	0.128***	0.039
Household size	654	6.127	6.914	-0.787***	0.172
hh_all_elderly	654	0.002	0.005	-0.002	0.005
hh_single_adult	654	0.085	0.073	0.013	0.023
hh_acr_2009	654	0.991	0.977	0.014	0.010
hh_mainliv_2009	654	0.641	0.632	0.009	0.040
num_adult	654	3.005	3.282	-0.277*	0.163
crop_2009	654	0.039	0.127	-0.088***	0.021
Age of household head	654	40.839	43.168	-2.329**	1.022
house_huts_2009	654	1.194	1.041	0.153**	0.063
house_elec_2009	654	0.060	0.045	0.014	0.034
house_agrland_2009	654	0.021	0.605	-0.584	0.389
mainliv_farming_2009	654	0.014	0.041	-0.027**	0.012
mainliv_hhbusiness_2009	654	0.101	0.164	-0.062**	0.027
mainliv_transport_2009	654	0.005	0.009	-0.004	0.006
mainliv_employment_2009	654	0.023	0.023	0.000	0.012
mainliv_remittances_2009	654	0.014	0.014	0.000	0.010
wealth_index_2009_q5_2	654	0.198	0.205	-0.006	0.033
wealth_index_2009_q5_3	654	0.210	0.182	0.028	0.033
wealth_index_2009_q5_4	654	0.203	0.195	0.007	0.033
wealth_index_2009_q5_5	654	0.210	0.177	0.032	0.033
N	654				

APPENDIX 2: 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 intuition of PSM is to match each participant with a non-participant that was observationally similar at baseline and to obtain the programme 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).³

The following sections describe and test 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) demonstrated that it is possible to match individuals using a prior probability for an individual to be in the intervention group, naming this its 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.

Table A2.1 presents the probit regression results used to estimate the propensity scores in our context. To guarantee that none of the matching variables were affected by the intervention, we only considered variables that were measured at baseline, and only those variables that were unlikely to have been influenced by anticipation of project participation (Caliendo, 2008).

Table A2.1: Estimating the propensity scores

	Coefficients	Standard Error	P-value
Education of household head	-0.157387	.0384584	0.000
Members with no education	-0.0227739	.1101114	0.837
Members – Koranic education	-0.0808935	.1048566	0.436
Household size	0.0344474	.0110013	0.002
Members of household all elderly	0.3647736	.401161	0.410
Household had single adult	0.0395612	.0801109	0.616
Number of acres owned- household	-0.2419841	.1728599	0.160
Main livelihood hh-casual labour	0.1154092	.0535955	0.036
Number of adults in household	0.0058168	.0129598	0.654
Household members grew any crops	0.25873	.0901966	0.004
Age of household head	0.0010466	.0019091	0.584
Number of huts in the compound	-0.0872834	.0303007	0.004
Household had electricity	-0.0245466	.0520479	0.636
Household had agricultural land	0.1165456	.0768281	0.120
Main livelihood was household business	0.3033193	.0784927	0.000
Main livelihood was transport services	0.3366605	.2464771	0.201
Main livelihood was formal employment	0.2991593	.1414119	0.040
Main livelihood was remittances	0.1569738	.1987434	0.416
Wealth_index_2009_q5_2	-0.0458119	.0591318	0.447
Wealth_index_2009_q5_3	-0.0518558	.0603789	0.401
Wealth_index_2009_q5_4	-0.0175092	.0625087	0.781
Wealth_index_2009_q5_5	-0.0198292	.0679476	0.772
Observation	654		

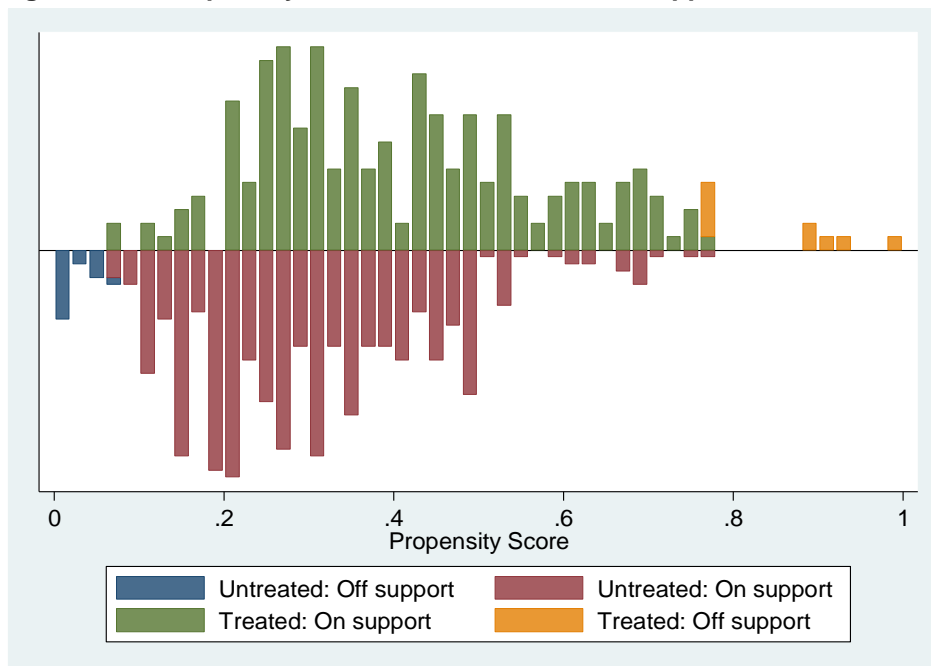
Defining the region of common support

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 observation 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 the baseline and demographic characteristics (as detailed in Section 4.2), some of the households in the intervention group are too different from the comparison group to allow for meaningful comparison. We developed 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). In this particular case, none of the 434 households surveyed in the comparison villages and 7 of the 220 households surveyed in the intervention villages were dropped because of lying outside the common support area. This means 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.

Figure A2.1 illustrates the area of common support and indicates the proportion of households lying on and off the common support area, by treatment group.

Figure A2.1: Propensity score on and off common support



Matching intervention households to 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 (note that we use alternative matching procedures as a means of robustness checks in Appendix 3). The kernel matching method 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 get a larger weight than 'poor' matches.

We used the psmatch2 module in STATA using 0.06 as a bandwidth and restricting the analysis on the area of common support. When using PSM, standard errors of the estimates were bootstrapped (stratified by community) using 1,000 repetitions to account for the additional variation caused by the estimation of the propensity scores and the determination of the common support.⁴

Check balancing

For PSM to be valid, the intervention group and the matched comparison group need to be balanced in that they needed 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 group 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 Table A2.2. None of the variables implemented for the matching are statistically significant once the matched sample is used. Moreover the programme tests the joint significance for all the variables specified in the model, the model is jointly statistically significant with the unmatched sample, whereas all the variables are jointly statistically insignificant in the matched model.

Table A2.2: Balancing test on the full set of baseline covariates

Psmatch2 Treatment Assignment	Psmatch2 Common Support		Total
	Off Support	On Support	
<i>Untreated</i>	0	434	434
<i>Treated</i>	7	213	220
<i>Total</i>	7	647	654

Covariates	Unmatched Matched	Mean		% bias	% reduction bias	P-value
		Treated	Control			
Education of household head	U	0.6	0.93779	-43.5		0.000
	M	0.60563	0.62445	-2.4	94.4	0.734
Members with no education	U	0.39091	0.2534	29.7		0.000
	M	0.38967	0.36151	6.1	79.5	0.549
Members – Koranic education	U	0.56818	0.69585	-26.7		0.001
	M	0.57277	0.60239	-6.2	76.8	0.536
Household size	U	6.9136	6.1265	37.6		0.000
	M	6.8357	6.8352	0.00	99.9	0.998
Members of household all elderly	U	0.00455	0.0023	3.8		0.624
	M	0	0.00081	-1.4	63.9	0.679
Household had single adult	U	0.07273	0.08525	-4.6		0.580
	M	0.07512	0.0792	-1.5	67.4	0.875
Number of acres owned- household	U	0.97727	0.99078	-10.8		0.162
	M	0.97653	0.97976	-2.6	76.1	0.820
Main livelihood hh-casual labour	U	0.63182	0.64055	-1.8		0.827
	M	0.6385	0.65803	-4.1	-123.6	0.674
Number of adults in household	U	3.2818	3.0046	13.9		0.090
	M	3.2629	3.3095	-2.3	83.2	0.821
Household members grew any crops	U	0.12727	0.03917	32.2		0.000
	M	0.10798	0.12681	-6.9	78.6	0.547
Age of household head	U	43.168	40.839	19.2		0.023
	M	43.15	43.081	0.6	97.0	0.953
Number of huts in the compound	U	1.0409	1.1935	-20.6		0.016
	M	1.0469	1.0179	3.9	81.0	0.662
Household had electricity	U	0.04545	0.05991	-3.8		0.668
	M	0.04695	0.04899	-0.5	85.9	0.952
Household had agricultural land	U	0.60455	0.02074	10.2		0.134
	M	0.02347	0.02183	0.0	99.7	0.941
Main livelihood was farming	U	0.04091	0.01382	16.6		0.029
	M	0.03286	0.04622	-8.2	50.7	0.481
Main livelihood was household business	U	0.16364	0.10138	18.4		0.022

	M	0.15962	0.1321	8.1	55.8	0.422
Main livelihood was transport services	U	0.00909	0.00461	5.4		0.488
	M	0.00939	0.00584	4.3	20.7	0.674
Main livelihood was formal employment	U	0.02273	0.02304	-0.2		0.980
	M	0.02347	0.02724	-2.5	-1098.8	0.805
Main livelihood was remittances	U	0.01364	0.01382	-0.2		0.984
	M	0.01408	0.01145	2.3	-1298.1	0.809
Wealth_index_2009_q5_2	U	0.20455	0.19816	1.6		0.847
	M	0.20657	0.17003	9.1	-472.0	0.336
Wealth_index_2009_q5_3	U	0.18182	0.20968	-7.0		0.401
	M	0.17371	0.18899	-3.8	45.1	0.683
Wealth_index_2009_q5_4	U	0.19545	0.20276	-1.8		0.826
	M	0.19718	0.1928	1.1	40.0	0.909
Wealth_index_2009_q5_5	U	0.17727	0.20968	-8.2		0.327
	M	0.1831	0.1941	-2.8	66.1	0.772
Observations		213	434			

Sample	Ps R ²	LR-chi2	p>Chi2	Mean bias	Median bias	B	R	%concern	%bad
<i>Unmatched</i>	0.114	94.98	0.000	13.8	10.2	31.1*	24.62*	26	22
<i>Matched</i>	0.006	3.40	1.000	3.5	2.6	17.8	0.91	13	9

* If B>25%, R outside (0.5; 2)

APPENDIX 3: ROBUSTNESS CHECKS

In order to address the validity of the results presented in Section 5, a series of robustness checks were carried out to check if the preferred matching algorithm is the one that best performs the matching between intervention and comparison groups. This section presents a number of alternative matching algorithms used to test the robustness of the estimates presented in Section 5.

1 Multivariate regression

The first basic specification for estimating the impact of project participation is an OLS model (when the dependent is continuous) or probit model when the dependent is binary.

$$Y_i = \alpha + \beta_1 \text{Project participation}_i + \delta' X_i + \varepsilon_i$$

Where Y_i is the dependent variable; X_i is a vector of household covariates used in the parsimonious model in Table A1.1; finally the variable of interest is the dummy variable *Project Participation* that assumes value equal to one when the household is enrolled in the project, zero otherwise. When the dependent variable Y_i is binary, a probit model replaces the OLS specification.⁵ It is important to note that in absence of randomised allocation of the project among the population in our sample, OLS and probit models fail to identify the causal effect of the programme, and can only be used as additional qualitative checks for the non-parametric estimates. Only the estimate of β_1 will be reported. A Fully Interacted Linear Model (FILM) allows a flexible specification of the OLS that allows the treatment effect to vary according to all observable variables.

2 Propensity Score Matching – Nearest Neighbour

The Nearest Neighbour matching algorithm finds an observation from the comparison group to be matched with an observation from a treated individual that is closest in terms of their propensity score. Several variants of NN matching are possible, e.g. NN matching 'with replacement' and 'without replacement'. In the former case, an untreated individual can be used more than once as a match, whereas in the latter case it is considered only once. Matching with replacement involves a trade-off between bias and variance. If we allow replacement, the average quality of matching will increase and the bias will decrease. This is of particular interest with data where the propensity score distribution is very different in the treatment and the control group. (Caliendo and Kopeinig, 2008). Estimates in the analysis will allow matching with nearest neighbours with replacement.

3 Propensity Score Matching – Caliper

NN matching faces the risk of bad matches, if the closest neighbour is far away. This can be avoided by imposing a tolerance level on the maximum propensity score distance (caliper). Imposing a caliper works in the same direction as allowing for replacement. Bad matches are avoided and hence the matching quality rises. However, if fewer matches can be performed, the variance of the estimates increases. Applying caliper matching means that an individual from the comparison group is chosen as a matching partner for a treated individual that lies within the caliper ('propensity range') and is closest in terms of propensity score. Estimates in this analysis will impose a caliper of 0.05.

4 Propensity Score Weighting

Following the example of Hirano and Imbens (2001)⁶ we implemented a regression adjustment with weights based on the propensity score. The average treatment effect can be estimated in a parametric framework as follows:

$$Y_i = \alpha + \beta_1 \text{Project participation}_i + \delta_2' Z_i + \delta_1' X_i + \varepsilon_i$$

Where Y_i represents the outcome of interest; $\text{Project participation}_i$ is a Bernoulli variable equal to one if an individual/household is enrolled into the programme and zero otherwise; X_i is a vector of matching covariates used to estimate the propensity score match; and Z_i is a vector of control variables that cannot be used for the matching as they are not supposed to influence project participation. The regression is estimated with weights equal to one for the treated units and $\hat{e}(x)/(1 - \hat{e}(x))$ for control units.

This parametric regression analysis framework has the advantage of exploring heterogeneity in the treatment effect. Moreover it allows controlling for variables that cannot be included in the propensity score equation.

The robustness check tables will only report β_1 .

Table A3.1: Share of animals that belonged to respondent and her household members in the past 12 months

	1	2	3	4
	OLS/Probit	PSM NN	PSM Caliper	Propensity Score Weighting
Number of cows owned by respondent and household	0.113 (0.383)	0.033 (0.512)	0.033 (0.511)	0.001 (0.374)
N	647	647	647	647
Number of goats owned by respondent and household	1.914** (0.810)	2.259** (1.152)	2.259** (1.110)	2.170*** (0.794)
N	647	647	647	647
Number of sheep owned by respondent and household	0.474** (0.235)	0.807*** (0.268)	0.807*** (0.267)	0.550** (0.224)
N	647	647	647	647
Number of herd camels owned by respondent and household	-0.096 (0.099)	0.075 (0.141)	0.075 (0.137)	-0.100 (0.097)
N	647	647	647	647
Number of pack camels owned by respondent and household	0.008 (0.018)	0.019 (0.026)	0.019 (0.027)	0.007 (0.017)
N	647	647	647	647
Number of donkeys owned by respondent and household	0.036 (0.024)	0.038 (0.030)	0.038 (0.031)	0.035 (0.023)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching

Table A3.2: Livestock owned by respondent and household members in 2009

	1	2	3	4
	OLS/Probit	PSM NN	PSM Caliper	Propensity Score Weighting
Cows owned by respondent and household members in 2009	-0.250 (0.609)	0.255 (0.737)	0.255 (0.711)	-0.254 (0.537)
N	647	647	647	647
Goats owned by respondent and household members in 2009	-1.219* (0.624)	-1.382 (1.188)	-1.382 (1.138)	-1.132* (0.582)
N	647	647	647	647
Sheep owned by respondent and household members in 2009	-1.032*** (0.361)	-0.962 (0.633)	-0.962 (0.647)	-0.958*** (0.317)
N	647	647	647	647
Herd camels owned by respondent and household members in 2009	-0.239 (0.148)	0.057 (0.236)	0.057 (0.197)	-0.258 (0.162)
N	647	647	647	647
Pack camels owned by respondent and household members in 2009	0.023 (0.018)	0.028 (0.023)	0.028 (0.023)	0.021 (0.071)
N	647	647	647	647
Donkeys owned by respondent and household members in 2009	-0.011 (0.019)	-0.061 (0.070)	-0.061 (0.068)	-0.016 (0.019)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.3: Participation in community groups

	1	2	3	4
	OLS/Probit	PSM NN	PSM Caliper	Propensity Score Weighting
Respondent, or any household member, regularly participates in group meetings %	19.4*** (4.3)	22.6*** (6.1)	22.6*** (5.8)	19.7*** (4.3)
N	647	647	647	647
Male members of household regularly participate in group meetings %	6.4 (3.9)	9.0* (5.4)	9.0* (5.1)	6.4* (3.8)
N	647	647	647	647
Female members of household regularly participate in group meetings %	12.8*** (3.1)	12.3*** (3.8)	12.3*** (3.9)	13.6*** (3.0)
N	647	647	647	647
Both male and female members regularly participate in group meetings %	0.000 (0.016)	0.000 (0.021)	0.000 (0.020)	0.2 (1.4)
N	647	647	647	647
Respondent or any household member participated in group meetings in 2009 %	5.7 (3.9)	7.5 (5.2)	7.5 (5.1)	5.5 (3.7)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.4: Income from livestock and milk sales

	1	2	3	4
	OLS/probit	PSM NN	PSM Caliper	Propensity Score Weighting
Increased income from milk sales %	15.9*** (3.2)	15.1*** (4.2)	15.1*** (4.0)	15.8*** (3.1)
N	647	647	647	647
Increased income from livestock sales %	16.9*** (3.1)	17.9*** (4.0)	17.9*** (3.7)	17.4*** (3.0)
N	647	647	647	647
Recovery of livestock herds (No. of livestock)	1.148 (1.180)	2.552 (1.564)	2.552 (1.573)	1.356 (1.244)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.5: Use of donkey carts for income generation

	1	2	3	4
	OLS / probit	PSM NN	PSM Caliper	Propensity Score Weighting
Use of donkey carts for income generation %	5.9*** (2.5)	7.5*** (2.6)	7.5*** (2.6)	5.3* (2.8)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.6: Community members' involvement in project management.

	1	2	3	4
	OLS/probit	PSM NN	PSM Caliper	Propensity Score Weighting
Community does not question projects implemented %	-9.5** (4.0)	-8.0 (6.1)	-8.0 (5.8)	-5.0 (4.5)
N	647	647	647	647
Community gives feedback on project plans %	9.7** (4.0)	8.0 (6.1)	8.0 (5.8)	5.4 (4.5)
N	647	647	647	647
Community discuss with external organizations on how to improve projects %	8.3** (4.0)	8.5 (6.3)	8.5 (6.4)	6.5 (4.6)
N	647	647	647	647
Community does not have influence on projects implemented %	-8.1** (4.0)	-8.5 (6.3)	-8.5 (6.4)	-6.5 (4.6)
N	647	647	647	647
Community asks questions on how new projects benefit them %	11.3*** (4.0)	14.6** (6.4)	14.6** (6.0)	12.4*** (4.6)
N	647	647	647	647
No opportunity to ask questions on new project benefits %	-11.1*** (4.0)	-14.6** (6.4)	-14.6** (6.0)	-12.3*** (4.6)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.7: Awareness of community initiatives and responsibilities.

	1	2	3	4
	OLS/Probit	PSM NN	PSM Caliper	Propensity Score Weighting
Aware of new initiatives carried out in community in past 12 months %	12.0*** (4.1)	13.6** (6.4)	13.6** (6.5)	13.0*** (4.6)
N	647	647	647	647
Initiative taken by local leaders %	4.7 (3.5)	1.9 (5.5)	1.9 (5.5)	5.9 (3.9)
N	647	647	647	647
Initiative taken by community members %	1.0 (3.7)	8.5 (5.6)	8.5 (5.7)	2.1 (4.2)
N	647	647	647	647
Initiative taken by external organisation %	0.0 (1.2)	-2.8 (2.1)	-2.8 (2.1)	-0.2 (1.7)
N	647	647	647	647
Male household members involved in monitoring initiative %	3.2 (3.2)	2.8 (4.6)	2.8 (4.7)	3.4 (3.5)
N	647	647	647	647
Female household members involved in monitoring initiative %	1.5 (2.1)	2.8 (3.0)	2.8 (3.0)	2.1 (2.3)
N	647	647	647	647
Male and female household members involved in monitoring initiative %	3.2 (3.2)	2.8 (4.6)	2.8 (4.7)	3.4 (3.5)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.8: Household consumption

	1	2	3	4
	OLS/Probit	PSM NN	PSM Caliper	Propensity Score Weighting
Food consumption per adult equivalent per day (pesos)	-2604.464 (2581.191)	-5456.059 (4015.529)	-5456.059 (4062.255)	-2378.617 (2485.558)
N	647	647	647	647
Food consumption per adult equivalent per day (logarithm of pesos)	-0.054 (0.069)	-0.080 (0.105)	-0.080 (0.101)	-0.047 (0.067)
N	647	647	647	647
Total household consumption per adult equivalent per day (pesos)	-2382.325 (2882.923)	-4709.372 (4431.718)	-4709.372 (4507.305)	-2156.081 (2775.923)
N	647	647	647	647
Total household consumption per adult equivalent per day (logarithm of pesos)- New Global Indicator	-0.029 (0.062)	-0.022 (0.097)	-0.022 (0.095)	-0.023 (0.061)
N	647	647	647	647
Old Global indicator for livelihoods support	-0.041 (0.041)	-0.032 (0.063)	-0.052 (0.066)	-0.018 (0.047)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

Table A3.9: Wealth index

	1	2	3	4
	OLS/probit	PSM NN	PSM Caliper	Propensity Score Weighting
Difference in wealth index between 2009 and date of survey	0.041*** (0.011)	0.028 (0.018)	0.028 (0.017)	0.027** (0.013)
N	647	647	647	647
<i>Number of quintiles of wealth index in which household increased</i>	0.548*** (0.102)	0.394*** (0.148)	0.394*** (0.152)	0.351*** (0.125)
N	647	647	647	647

Standard errors in parentheses; * p<0.1, ** p<0.05, *** p<0.01; PSM estimates are bootstrapped with 1,000 repetitions, with standard errors clustered by community. All means are calculated *after* matching.

NOTES

- 1 A mature project has been running for long enough – typically at least 2.5 years – to have a reasonable expectation of impact, with either an expenditure rate of at least 70% or completion of most project activities.
- 2 When items are used in a scale or index, they should all measure the same underlying latent construct (e.g. household wealth status). The items, then, must be significantly correlated with one another. Cronbach's alpha is a measure of this inter-item correlation. The more the variables are correlated, the greater is the sum of the common variation they share. If all items are perfectly correlated, alpha would be 1 and 0 if they all were independent from one another. For comparing groups, an alpha of 0.7 or 0.8 is considered satisfactory. See: Bland, M. J. & Altman, D. G. 1997. Statistics notes: Cronbach's alpha. *BMJ*, 314, 572.
- 3 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.
- 4 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.
- 5 Please remember to run the stata command `dprobit` which displays directly marginal effects.
- 6 Hirano, K. & Imbens G.W. (2001), Estimation of Causal Effects using Propensity Score Weighting: An Application to Data on Right Heart Catheterization. *Health Services & Outcomes Research Methodology*, vol. 2, pp. 259–278.

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Oxfam GB, Oxfam House, John Smith Drive, Cowley, Oxford, OX4 2JY, UK.

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