North Karamoja Development
Project Effectiveness Review - Full Technical Report
Livelihood Support to Women's Groups

Oxfam GB
Livelihoods Global Outcome Indicator

December, 2011

Photo credits: Crispin Hughes and Caroline Gluck

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Executive Summary

As per Oxfam Great Britain's (OGB) Global Performance Framework (GPF), sufficiently mature projects are being randomly selected each year and their effectiveness rigorously assessed. Uganda's Livelihood Diversification and Support Project was originally selected in this way under the livelihood strengthening thematic area. However, it was realised that this project was too immature to be subjected to an "effectiveness review". Fortunately, it was identified as being connected to another project that is sufficiently mature, namely, the North Karamoja Development Project. Thus, a decision was taken to assess its effectiveness, including the extent to which it has promoted change in relation to OGB's global livelihood outcome indicator:

- **% of targeted households living on more than £1.00 per day per capita**

Through the North Karamoja Development Project and other complementary initiatives, OGB has been directly supporting 10 women's groups, made up of over 400 members, in Kotido and Kaabong districts of Uganda's Karamoja sub-region since 2007. This support primarily involved the construction and equipping of grain storage and milling facilities for each of the 10 groups and the provision of agricultural inputs and tools to their members. The women were also targeted with animal husbandry training, where they, among other things, were encouraged to utilise the services of animal health workers. Communal dams were also constructed to increase access to water for livestock owned by the members of the groups and wider community..

In August 2011, with the support of an external consultant, a household survey was administered to 188 randomly selected women from the groups, as well as 239 women from non-OGB supported groups in neighbouring communities. The survey comprised of questions not only relevant to the above indicator but also a number of other measures associated with the support's other intended outcomes. In order to compare like with like, statistical analysis of the resulting data was undertaken using propensity score matching (PSM) and multivariable regression (MVR) to control for measured differences between the intervention and comparison women.

Overall, no statistically significant difference was found between the two categories of women in relation to OGB's global livelihood indicator, indicating that the support has not raised household income. Moreover and unfortunately, no overall differences between the intervention and comparison groups were identified for the other outcome measures as well. The picture is different, however, when the data are disaggregated by district. Positive and statistically significant differences were identified for the OGB supported women in Kotido district in the areas of food security and self-reported agricultural production and profits. In addition, the women of Kaabong district reported less livestock loss over time than their comparators.

While there is little evidence to demonstrate that the support provided to the women has brought about any significant positive change, it is fully appreciated that the Karamoja sub-region is an exceptionally challenging development context. It is hoped that reflecting on the following programme learning considerations will enable the Oxfam Karamoja team to strengthen the Karamoja programme in general and the support that is being provided to the targeted women in particular:

- Assess whether Oxfam's advocacy strategy for Karamoja is sufficiently relevant
- Review intervention implementation and uptake in both Kotido and Kaabong to identify why there are reported differences in impact between the two districts
- Review the portfolio of support being provided to the women's groups and consider undertaking qualitative research to identify more focused support that is more likely to leverage substantive, sustainable change
- Explore the potential of investing more in agricultural production and commodity marketing
- Explore possibilities of supporting greater numbers of people with less resources

1.0 Introduction and Purpose

Oxfam GB has put in place a Global Performance Framework (GPF) as part of its effort to better understand and communicate its effectiveness and enhance learning across the organisation. This framework requires programme/project teams to report generic output data across six thematic indicator areas annually. In addition, modest samples of sufficiently mature projects (e.g. those closing during a given financial year) associated with each thematic indicator area are being randomly selected each year and rigorously evaluated. One key focus is on the extent they have promoted change in relation to relevant OGB global outcome indicators.

The following global outcome indicator was endorsed for the livelihoods strengthening thematic area:

- % of targeted households living on more than £1.00 per day per capita

The conceptual underpinnings of this indicator are presented in Section 4.0 below, and the work that took place in Kotido and Kaabong districts of Uganda in August 2011 was part of an effort to capture data on this indicator. The original project that was randomly selected for the effectiveness review was the Livelihood Protection and Diversification Support Project (UGAB40). However, this project only officially started in April, 2010, and it was clear that sufficient time had not passed for it to be amenable for an effectiveness review. After discussion and exploration with the OGB Kotido team, it was found that UGAB40 was linked to another project that was sufficiently mature – the North Karamoja Development Project (UGAB04). The dimension of this project found compatible with the livelihood indicator was its provision of support to 10 women's groups in Kotido and Kaabong districts. At the time of data collection, the total number of women being supported in the 10 groups was 419.

This report documents the findings of the effectiveness review of support provided to 10 women's groups in Kotido and Kaabong districts of Uganda's Karamoja sub-region.

Given this, one of the key purposes of the evaluation exercise was to assess the extent members of these supported groups are better off in relation to the global livelihood indicator than had they never been supported. However, attempts were further made to assess the impacts of the support on many of the project's other intended outcomes, e.g. improved household food security and the empowerment of women.

This report presents the findings emerging from the impact evaluation process. However, before doing so, Section 2.0 first provides brief background information on the context in which the project is being implemented, while Section 3.0 explains the intervention logic associated with the various interventions targeted at the 10 women groups. Section 4.0, Section 5.0, and Section 6.0 follow by presenting the conceptual frameworks underlying the indicators, the impact evaluation design that was used, and the methods of data collection and analysis, respectively. Section 7.0 is the longest section of this document. Its subsections include those related to basic descriptive statistics, intervention exposure, and finally the overall differences between intervention and comparison women's groups. Section 8.0 then concludes the document with general conclusions and suggestions for strengthening livelihoods development support in Kotido and Kaabong districts.

2.0 Brief Description of the North Karamoja Context

The Karamojong are an ethnic group of agro-pastoralists residing primarily in the north-east of Uganda. (See Figure 2.1.) The evaluated interventions were implemented in two districts where two of the seven Karamojong clans reside, i.e. Kotido district (home of the *Jie*) and Kaabong district (home of the *Dodoth*). The reader should be fully aware that the context in which the North Karamoja Development Project was implemented is an exceptionally challenging one, particularly from a community development perspective. What is presented in this section is not intended to be a comprehensive description of the North Karamoja context but seeks to highlight several important issues that should be kept in mind when interpreting the findings of this report. First, the sub-region has been plagued by chronic food insecurity for many decades, with food aid being distributed regularly and extensively throughout the sub-region since the 1960s. This has undermined many traditional coping mechanisms and fostered a culture of dependency.

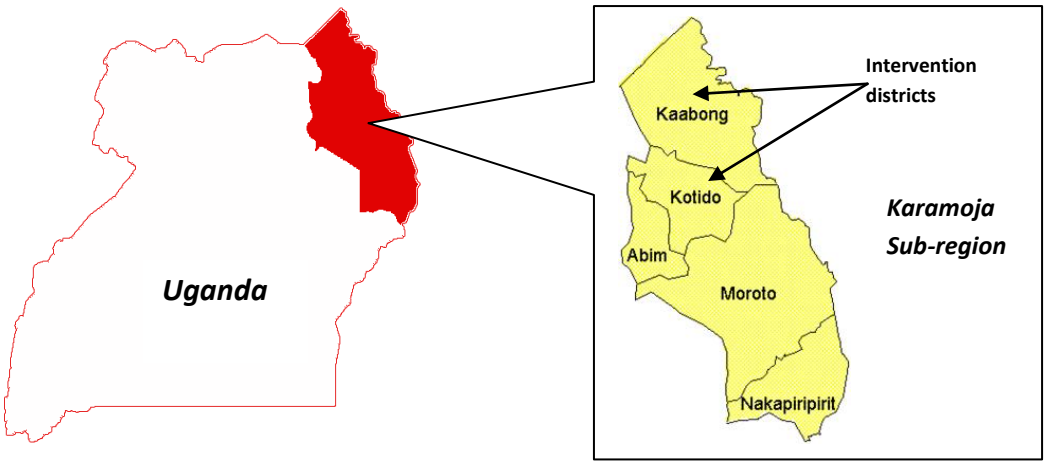


Figure 2.1: Location of Intervention Sites

There are multiple factors at play that interact to make the Karamoja sub-region an exceptionally challenging development context.

The second major issue is related to security. Traditionally, the Karamojong have raided others (including each other's clans) for cattle and, to a lesser extent, other types of livestock, a practice which continues to the present day. With the relatively recent acquisition of guns by many "warriors", including AK47s, both the extent of, and negative effects associated with, raiding have been considerably magnified. There is not only considerable tension between the Karamojong and other neighbouring ethnic groups within Uganda and its neighbouring countries but also between the Karamojong clans. Relations between the Jie and Dodoth are no exception, with the two frequently raiding and attacking one another. This heightened insecurity led the Government of Uganda to take action to improve security in the sub-region, resulting in two additional development challenges. The first challenge is a consequence of the attempts to disarm the Karamojong. We were informed, in particular, that disarmament attempts did not happen at the same time amongst the various Karamojong clans. In particular, some clans were disarmed while others were not, thereby, leaving the former open to attack. This resulted in considerable livestock loss for many households, a fact supported by the data collected during the assessment exercise (see below).

In an attempt to further mitigate cattle raiding, the government has also set up military protected corrals, where all herders are required to keep their livestock

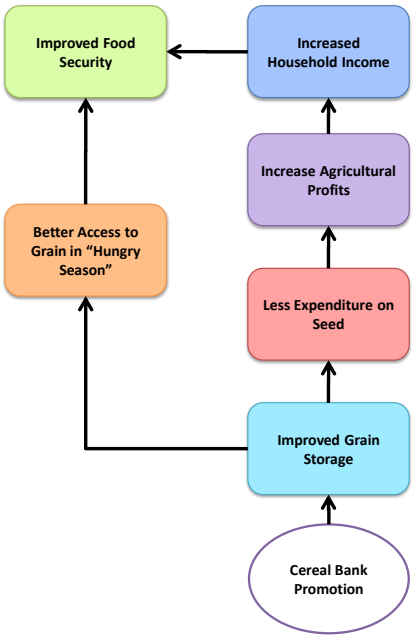
from late afternoon until late morning. This deprives households of many of the traditional benefits associated with owning livestock, e.g. ready access to blood and milk. Anecdotal evidence also suggests that cow milking occurs within the protected corral by the military, and there were reports of cattle being stolen. There are also health issues associated with keeping large numbers of livestock in confined spaces for such extensive periods of time, including diseases such as foot rot. Finally, the protected corral intervention is preventing the Karamojong from pursuing the traditional practice of pastoral transhumance, where cattle are moved for several months during the year to neighbouring districts in search of pasture land and water. All of these issues, coupled with a historical lack of state investment in the sub-region, have further led to a number of social problems, such as alcoholism among both men and women.

3.0 Intervention Logic of the Support Provided to Targeted Women's Groups

The 10 women's groups were supported with multiple interventions, designed ultimately to reduce poverty, improve food security, and empower the women.

We were informed by the Kotido programme team that the women's groups had been supported in a number of different ways by Oxfam GB since 2007, both through the North Karamoja Development Project and other projects. One of the key interventions is the promotion of cereal banking. This involved the construction of structures (small warehouses) where members of the women's groups can safely store their grain, so they can a) sell it later in the season when grain prices are more favourable; b) reserve sufficient quantities of it for consumption during hard times, e.g. during the upcoming planting season; and/or c) ensure better access to seed for future planting. Figure 3.1 presents the logic of how the intended outcomes of the cereal banking intervention – increased household income and improved food security – are to come about. Improving grain storage is intended to ensure better access to grain, particularly during lean periods, thereby, improving household food security. The stored grain can also be used as seed in future planting seasons, which is intended to reduce expenditure on agricultural inputs. This is expected to bolster agricultural production and, ultimately, increase household income.

FIGURE 3.1:
Intervention Logic – Cereal Banking



In the same structures as the grain storage "mini-warehouses", grinding machines were further set-up for the women's groups. These are intended to generate income, which they can directly share, thereby, increasing household income. Alternatively, they can use the income to invest in other income generating

activities (IGAs), making their money grow further. The women's increased involvement in productive pursuits is also intended to elevate their status, as well as their ownership and control over "strategic assets". This ultimately is intended to elevate their status and enable them to play a greater role in decision-making.

The groups were also provided with agricultural inputs and farming implements. Figure 3.3 presents a simple theory of change of how this intervention is intended to both increase household income and improve household food security. The immediate intended effect is to increase crop production. This is to then directly improve household food security and indirectly increase household income through increasing agricultural profits.

Grain storage facilities and grinding mills were set up for each women's group, and they were provided with agricultural implements and tools .

The women's groups and others are also being supported by two additional interventions that are intended to improve livestock health (Figure 3.4). These include the promotion of animal health workers, including utilisation of their services (e.g. vaccination), and the construction of dams to increase access to water for livestock. The latter is thought particularly relevant, given the mobility restrictions imposed on pastoralists as a result of the government's directive that all cattle be kept in militarily protected corrals during the night. Improved livestock health is then intended to increase the availability of livestock products, including blood and milk, and, in turn, both improve household food security and increase household income.

FIGURE 3.2:
Intervention Logic – Grinding Mills

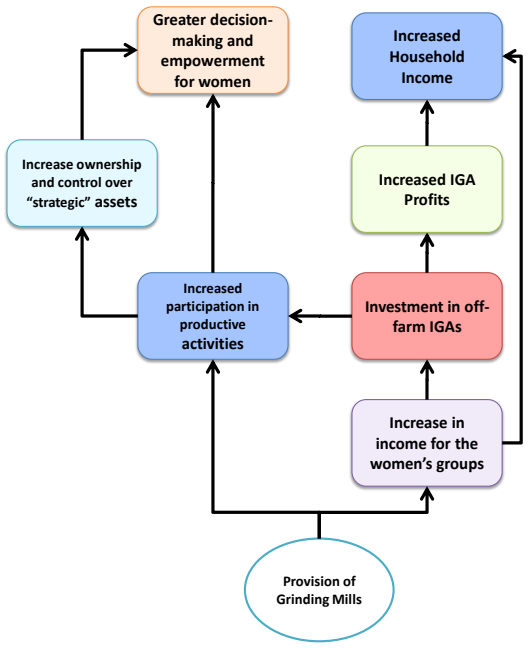


FIGURE 3.3:
Intervention Logic – Provision of Agricultural Inputs and Implements

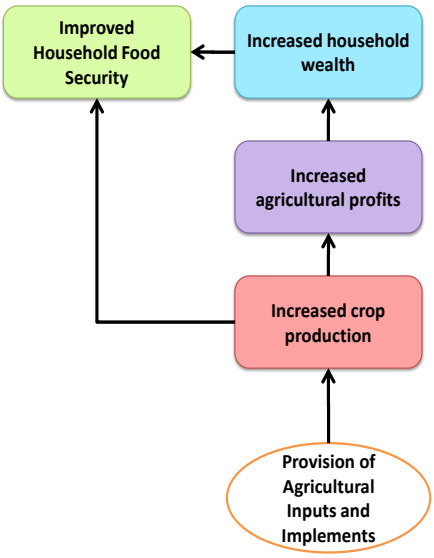
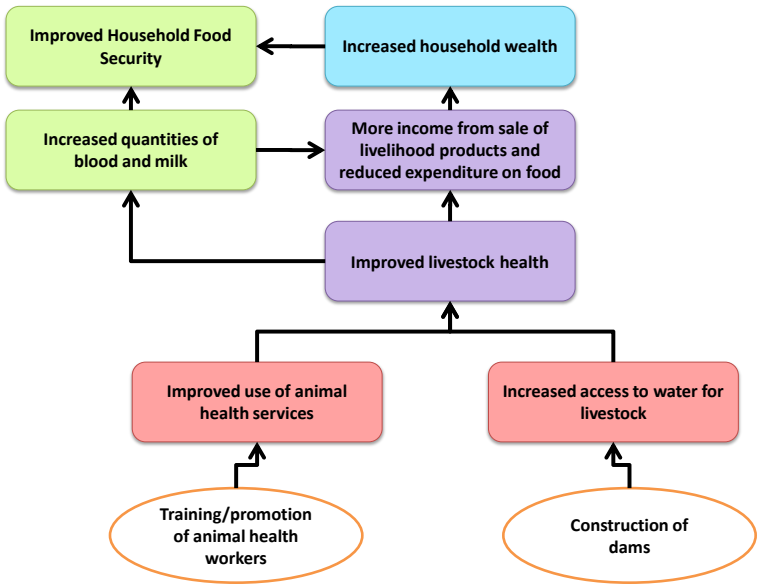


FIGURE 3.4:
Intervention Logic – Training/Promotion of Animal Health Workers and Dam Construction



4.0 The Livelihood Outcome Indicator, Other Measures Used, and their Conceptual Underpinnings

4.1 The Livelihood Outcome Indicator

OGB's global livelihoods indicator is informed by consumption and expenditure data, given that most of the people it supports are not formally employed.

Measuring household wealth or socioeconomic position in low income countries is not straightforward, particularly in rural areas where respondents tend to be self-employed. Self-reported measures of total income are unreliable, given the wide variety of endeavours such populations engage in to generate income.[1] However, given that there is a widely recognised and strong association between household income and consumption,[2] one popular proxy measure used by the World Bank and other international institutions involves the aggregation of both household consumption and expenditure data.[3] It is through these data that the percentages of households living on more than USD $1.25 per day per capita are estimated.

To capture data on this indicator, a household survey is administered that contains a consumption and expenditure module. The respondents are asked what types of food they consumed over the previous seven day period, as well as the particular quantity. The quantity is transformed into a monetary value, i.e. either how much they paid for the food item in question or, if the food item was from their own production, how much they would have paid if it was bought from the local market. The respondents are also asked how much they spent on particular regular non-food items and services from a list such as soap, toothpaste, and minibus fares over the past four weeks. Finally, they

[1] Morris, Saul, Calogero Carletto, John Hoddinott, and Luc J. M, Christianensen. (1999) *Validity of Rapid Estimates of Household Wealth and Income for Health Surveys in Rural Africa: FCND Discussion Paper No. 72*. Washington: International Food Policy Research Institute.
[2] See Gujarati, Damodar N. (2003) *Basic Econometrics: Fourth Edition*. New York: McGraw Hill.
[3] Deaton, A and S. Zaidi. 2002. "Guidelines for constructing consumption aggregates for welfare analysis," Working Paper No. 135. The World Bank, Washington, D.C.

are asked for any household expenditure on non-regular non-food items such as school and hospital fees, clothes, and home repair over the last 12 months. For non-food items that are gender divisible, data are collected in a gender disaggregated fashion, thereby, enabling intra-household consumption inequality to be measured as well.

The basic per capita measure is calculated as follows for each household:

(((expenditure_food_item_1 + expenditure_food_item_2 +… + expenditure_food_item_n)/7) + ((expenditure_regular_item_1 + expenditure_regular_item_2 + … + expenditure_regular_item_n)/30) + ((expenditure_non-regular_item_1 + expenditure_non-regular_item_2 + … + expenditure_non-regular_item_n)/365))/household size

Household respondents are asked to recall the types and quantities of food consumed during the previous week, as well as how much they spent on various non-food items.

The resulting variable can remain continuous, and the average per capita consumption and expenditure can be calculated for the sample in question. It can also be transformed into a binary variable (e.g. > £1.00), so that the proportion of households living above a certain monetary figure can be calculated. Placing the continuous version of the variable on a logarithmic scale is also possible, which can improve model fit in regression analysis and reduce the influence of outliers.

While dividing the above equation by household size as the overall denominator is recommended in the literature, using a more nuanced calculation is deemed important to avoid underestimating the wealth status of larger sized households relative to their smaller counterparts. A recommended formula for calculating household size is: HH_size where *A* is number of adults in the household; *K* is the number of children; is the cost of a child relative to an adult; and controls the extent of economies of scale. For low income countries, is recommend that be set at .25 or .33 and be set at .9.[4]

4.2 Other Outcome Measures

As reviewed in Section 3.0 above, the support provided to the women's groups is intended to bring about a number of other outcomes, in addition to raising household income. Given this, data were collected on a number of additional outcome measures. These include those relating to:

- **Household food security**

Household food security was measured using the Household Food Insecurity Access Scale (HFIAS) developed by USAID's Food and Nutrition Technical Assistance (FANTA) Programme.[5] The set of questions form a module in a household questionnaire. Respondents are asked to describe perceptions and behaviours that relate to various aspects of the food insecurity experience. For example, a question relating to perceptions of food quantity asks whether anyone in the household had to eat less than normal. The consequence related questions include one about whether anyone in the household went to bed hungry because there was not enough food.

[4] Ibid.
[5] http://www.fantaproject.org/publications/hfias_intro.shtml

- **Household ownership of assets**

Household ownership of assets is an alternative way of measuring household wealth and thus complements the consumption and expenditure measure presented above. Households were asked whether they own a number of different assets from lists of various types, e.g. radios and bicycles, as well as the materials used to construct the roof, walls, and floors of their homes and size of their agricultural land holdings. It is further assumed that ownership of such assets in the past is something that can be reliably recalled. Respondents where then asked to recall this information with respect to the baseline period, thereby, enabling the reconstruction of baseline data for this particular variable. A statistical method known as principal component analysis (PCA) was run on all the assets in the dataset separately for both periods to develop asset indices. This is a data reduction method that transforms a number of possibly correlated variables into a smaller number of uncorrelated variables called principal components. In more simple terms, it narrows in on those assets where there is significant variability in ownership and uses them to assign scores based on the possession of these assets. Hence, households that possess more and less of these assets obtain higher and lower scores, respectively. The first principle component, in particular, accounts for as much variability in the data as possible, and forms the basis of the asset index. The resulting index, itself a continuous measure, can be divided into quantiles (e.g. three groups) to define different wealth groups (e.g. the poor, middle, and rich).

The support is intended to bring about many important changes for the targeted women, so the survey captured data on a variety of outcome measures .

- **Livestock ownership and health**

Given the socio-cultural context of North Karamoja, coupled with developments that have taken place in the recent past (e.g. the government's disarmament exercise), information on livestock ownership at the household level is taken as a very sensitive issue. In particular, it was assumed that directly asking household representatives how many cattle, they own, for example, would result in considerable under-reporting. Nevertheless, there was still a desire to obtain quality data on household livestock ownership.

This resulted in the application of what is known as the randomised response model (RRM). The simplest example of RRM is when the desired information is binary (yes/no) in nature, e.g. whether the household owns cattle or not, rather than a specific number. To access the sensitive information, the respondent is presented with a "randomisation device" such as a coin. The respondent is then instructed to utilise the randomisation device (e.g. flip the coin) and keep the resulting outcome confidential. S/he is instructed to answer "yes" for a particular outcome (e.g. the coin lands heads up) – *regardless of the actual truth*. If the output of the device goes the other way (e.g. the coin lands tails up), the respondent is directed to answer the question truthfully. In this way, if the respondent answers "yes" to the question, the interviewer has no way of knowing whether s/he said "yes" because it is the truth or because of the outcome of the randomisation device. While there is no way of knowing the truth with respect to a particular respondent, the average response for all the respondents combined can be obtained using a simple mathematical formula.

RRM can also be used when the data are continuous in nature, e.g. the actual number of cattle owned. In this case, the "randomisation" device is different in that it comprises of multiple numbers, e.g. an envelope with pieces of paper

with different numbers on them. To implement the model, the respondent randomly selects one of the numbers, keeps this number confidential, adds it to the true number, and then reports the total figure to the interviewer. For example, a respondent may draw the number 7 from the bag. While s/he actually owns 5 bulls, s/he responds to the question by stating 12. In this way, the interviewer cannot be sure of how many bulls the respondent actually owns; the actual figure is "scrambled" by the randomisation devise. Again, the average of the population can be obtained by subtracting the average of the numbers associated with the randomised device from the average of all the responses. There was a great deal of scepticism about whether this method would work with the respondents, most of whom are illiterate. However, after the enumerator practising exercise, it was agreed that the method was worth the effort and risk; it was believed that there was really no other practical way to access the information from respondents.

Efforts were additionally made to assess the health of livestock. This was done by directly asking the respondents the numbers of different types of livestock they have lost *due to disease* in the last two years.

- **Agricultural production and profits**

Respondents were asked whether their household's production of crops and income earned from the sale of crops and livestock products had changed since the baseline period, i.e. whether there had been no change, an increase, or a decrease. If they reported that there had been a change, they were asked to report the percentage of the increase or decrease using stones. In particular, 10 stones were used to represent what the situation was like in 2006. If, for example, the respondent thought that their household's crop production is double now to what is was in 2006, they were instructed to represent this by adding 10 more stones to the pile. If it was 50% greater, five stones, etc. If there was a decrease, the respondent was asked to subtract stones from the pile, e.g. five stones representing a decrease of 50 percent.

- **Women's involvement in household decision-making**

Women's empowerment measures were adapted from OGB's global toolset and incorporated into the questionnaire .

The instrument used was a streamlined version of one of OGB's full instrument for measuring women's empowerment. This instrument examines both the breadth and depth of women's involvement in household decision-making.

Breadth is defined in terms of the number of decision-making areas in which women are involved, e.g. decisions around food preparation, personal travel, and family planning. The full instrument comprises of 24 decision-making areas. However, the one used in the survey was focused on 10 areas thought most relevant for involvement in livelihood decision-making and the Karamojong context. These 10 decision-making areas include those related to: a) purchase of livelihood assets; b) purchase of livelihood inputs; c) purchase/sale of livestock; d) involvement in savings activities; e) giving relatives money; f) land use and management; g) the livelihood activities the respondent involves herself in; h) participation in community initiatives; i) personal travel; and j) what gifts to give to relatives when they marry.

Depth of involvement in household decision making is defined in relation to the extent of involvement in each area, i.e. exclusive involvement, very strong involvement, joint involvement, some involvement, or no involvement. The

response "not relevant" is also an option if the decision-making area does not apply to the respondent's household, e.g. decision making areas that pertain to children when none reside in the household.

- **Women's ownership of strategic assets**

To measure women's access to and control over strategic assets, the respondent was first asked whether she either fully or jointly owns any of the following: land, livestock, the home/dwelling she lives in, any other house or building, any major farm assets, any off-farm income generating assets, or any other valuable asset such a TV, jewellery, or furniture, as well as whether she has any savings. For assets she owns fully own, the respondent is then asked whether she would have the final say in decisions pertaining to their sale if this was desired/necessary. An affirmative response to this question is assumed to indicate that the respondent fully owns the asset.

4.3 Measuring Intervention Exposure

There was a desire to also assess the extent to which both the intervention and comparison women were exposed to the types of support associated with the project. Given this, the respondents were asked the extent they or any other members of their households made use of dams and grain storage facilities promoted by external organisations, as well veterinary services promoted by animal health workers, over the last 12 months. They were further asked whether they are a member of a group-based income generation scheme and whether they accessed loans to pursue household-level income generating activities (IGAs). Finally, they were asked about the number of times they received specific items from external organisations, including farming inputs, farming implements, cattle, goats and sheep, donkeys, and animal husbandry training since 2006.

5.0 Impact Assessment Design

5.1 Limitations in Pursuing the Gold Standard

The impact assessment attempted to estimate what would have happened to the supported women had OGB never supported them .

The core challenge of a social impact evaluation is to credibly estimate the net effect of an intervention or programme on its participants. An intervention's net effect is typically defined as the average gain participants realise in outcome (e.g. income) from their participation. In other words:

Impact = average post-programme outcome of participants – what the average post-programme outcome of these same participants would have been had they never participated

This formula seems straightforward enough. However, *directly* obtaining data on the latter part of the equation – commonly referred to as the counterfactual – is logically impossible. This is because a person, household, community, etc. cannot *simultaneously* both participate and not participate in a programme. The counterfactual state can therefore never be observed directly; it can only be estimated.

The randomised experiment is regarded by many as the most credible way of estimating the counterfactual, particularly when the number of units (e.g.

people, households, or, in some cases, communities) being targeted is large. The random assignment of a sufficiently large number of such units to intervention and control groups should ensure that the statistical attributes of the two resulting groups are similar in terms of a) baseline outcome status (e.g. both groups have the same average incomes); and b) their observed characteristics (e.g. education levels) and unobserved characteristics (e.g. motivation) that affect the outcome variables of interest. In other words, randomisation works to ensure that the *potential outcomes* of both groups are the same. As a result – provided that threats such as differential attrition and intervention spill-over are minimal – any observed outcome differences observed at follow-up between the groups can be attributed to the workings of the programme.

Outside the context of specially designed pilot studies, randomised evaluation designs are seldom implemented in the context of social programmes, particularly in low-income countries. There can be cost, feasibility, and/or ethical constraints that militate against their use or simply the desire among implementing agencies to work with purposively chosen populations. Moreover, there are often cases where the *opportunity* to participate in a programme is put in place – as would be the case with the setting up of a micro-credit programme – and people *choose* whether to participate. Those who choose to participate are likely to be different from those who do not, including in characteristics that are intrinsically difficult to measure, e.g. motivation.

5.2 Alternative Evaluation Design Pursued

The evaluation design involved comparing the OGB supported women with non-supported women, whist statistically controlling for measured differences between them.

There are several evaluation designs when the comparison group is non-equivalent that can – particularly when certain assumptions are made – identify reasonably precise intervention effect estimates. One solution is offered by matching: Find units in an external comparison group that possess the same characteristics, e.g. ethnicity, age, and sex, as those of the intervention group and match them on these characteristics. If matching is done properly in this way, the observed characteristics of the matched comparison group will be identical to those of the intervention group. The problem, however, with conventional matching methods is that with large numbers of characteristics on which to match, it is difficult to find comparators with similar combinations of characteristics for each of the units in the intervention group. The end result, typically, is that only a few units from the intervention and comparison groups get matched up, thereby, not only significantly reducing the size of the sample but also limiting the extent to which the findings can be generalised to all programme participants (referred to as the “curse of dimensionality” in the literature).

Fortunately, matching on the basis of the propensity score – the conditional probability of being assigned to the programme group, given particular background variables or observable characteristics – offers a way out. The way propensity score matching (PSM) works is a follows: Units from both the intervention and comparison groups are pooled together. A statistical probability model is estimated, typically through logit or probit regression. This is used to estimate programme participation probabilities for all units in the pooled sample. Intervention and comparison units are then matched

Two popular methods were used to address selection bias – propensity score matching and multivariable regression.

within certain ranges of their conditional probability scores. Tests are further carried out to assess whether the distributions of characteristics are similar in both groups after matching. If not, the matching bandwidth or calliper is repeatedly narrowed until the observed characteristics of the groups are statistically similar. Provided that a) the dataset in question is rich and of good quality; b) the groups possess many units with common characteristics (i.e. there is a large area of common support); and c) there are no unobserved differences lurking among the groups, particularly those associated with the outcomes of interest, PSM can produce reliable intervention effect estimates.

Multivariable regression is another approach that is also used to control for measured differences between intervention and comparison groups. It operates differently from PSM in that it seeks to isolate the variation in the outcome variable explained by being in the intervention group *net of other explanatory variables* (key factors that explain variability in outcome) included in the model. In this way, multivariable regression controls for measured differences between the intervention and comparison group. The validity of both PSM and multivariable regression are founded heavily on the "selection on observables" assumption, and, therefore, treatment effect estimates can be biased if unmeasured (or improperly measured) but relevant differences exist between the groups. Both PSM and multivariable regression were employed during data analysis, and efforts were made to capture key explanatory variables believed to be relevant in terms of the assessed outcomes, e.g. sex and age of household head (see Section 6.0 below).

While no baseline data were available, efforts were made reconstruct it through respondent recall. This method does have limitations, e.g. memory failure, confusion between time periods, etc. However, for data that can be sensibly recalled, e.g. ownership of particular household assets, it can serve to enhance the validity of a cross-sectional impact evaluation design. The reconstructed baseline data were used in two ways. First, several of the variables included in the PSM and regression procedures were baseline variables constructed from recalled baseline data. One set of variables, for example, was related to the respondents wealth status at baseline, e.g. whether they were asset rich, asset poor, or somewhere in between. This was done in attempt to control for baseline wealth differences between the intervention and comparison groups. The second way it was used was to derive pseudo difference-in-differences intervention effect estimates. With longitudinal or panel data, this is implemented by subtracting each unit's baseline measure of outcome from its endline measure of outcome (i.e. endline outcome status minus baseline outcome status). The intention here is to control for time invariant differences between the groups. Bearing in mind the limitations associated with recalled baseline data, using PSM and/or regression and the difference-in-differences approaches together is considered to be a strong evaluation design.

5.3 The Comparison Group

A key factor in ensuring the validity of any non-randomised impact evaluation design is to employ an appropriate comparison group. This is particularly true for ex-post, cross-sectional designs. Comparators that differ in relation to the baseline status of the outcome variable(s) of interest and/or who are

subjected to different external events and influences will likely result in misleading conclusions about programme impact. Identifying a plausible comparison group is therefore critically important and is, generally speaking, not an easy task in non-experimental work.

The difficulty increases when programme participants voluntary choose to participate in the programme. In particular, those in the community that self-select themselves into the programme are likely to be different – in both observable and unobservable ways – from those who do not. As such, comparing such participants directly with non-participants either from within the same community or even in adjacent, non-targeted communities will also result in biased estimates of programme impact. The challenge we confronted, then, was how to identify women who could be comparable with the women belonging to the supported groups. It was discovered that there were many other women's groups in areas where OGB was not working being supported by other NGOs. These groups were assumed to have been supported in different ways from the Oxfam GB supported groups. As such, it was thought that women from these groups would be suitable comparators.

The comparison group comprised of women who belong to other women's groups in neighbouring communities.

Using members of women's groups supported by other NGOs is, of course, different to comparing the OGB supported women with women who received no support at all. The evaluation design that was used therefore did not assess the impact of the support against whether the targeted women had received nothing. Rather, it assessed the extent to which these women are any better off than those who are being supported by the other NGOs. Given that OGB had been supporting the targeted women for longer and (it is assumed) in more substantive ways, it was expected that outcome differences between the two groups should be observable, *provided that OGB supported interventions are actually making a difference*. Furthermore, we assumed that the OGB supported women would have found themselves belonging to groups such as those being supported by other NGOs in the local area had OGB not been present, thereby, making members of women groups supported by other NGOs in adjacent communities a plausible approach to estimating the counterfactual.

6.0 Methods of Data Collection and Analysis

6.1 Data Collection

A household questionnaire was developed and adapted to the local context to capture data on both the outcome variables presented in Section 4.0 above, as well as other key characteristics of the targeted and comparison women to implement the evaluation design described in Section 5.0. It was pre-tested by two of the lead enumerators and subsequently revised. Potential enumerators were identified by the OGB Kotido team and 21 completed a two-day training course, led by a local Consultant with support from both the OGB Kotido and Global Advisory teams . The second day involved a practice run at administering the questionnaire, following which the performance of the enumerators was critically reviewed. This resulted in disengaging two of the enumerator trainees.

A questionnaire was administered to 427 randomly selected intervention and comparison women by 19 trained and locally recruited enumerators .

Each of the 10 supported women's groups was matched with a women's group being supported by another NGO from a nearby community. This was in an attempt to ensure that the comparison women came from similar socio-economic environments to the OGB support women and were similar, on average, in relation key spatial variables, e.g. distance from the district centre and main district road. Probability proportionate to size (PPS) sampling was then used to determine sample sizes for each of the OGB supported women groups. The sample sizes of each comparison group were determined by taking the sample size of the intervention group with which it had been matched, and increasing it by 50 percent[6]. Lists of members of both the intervention and comparison groups were compiled, and random samples of members were selected, as per the sample sizes calculated for each group. Reserve lists of women were also generated in the event that the sampled women could not be located.

Initial plans were to interview a total of 400 women, 160 OGB supported women and 240 comparators. The number of women actually interviewed was 427, 188 for the intervention group and 239 for the comparison group. Given that the two districts where the data collection took place are significantly different, e.g. they comprise of two different ethnic groups and one is more remote that the other, efforts were made to factor these differences into the analysis. For PSM, for example, exact matching was enforced by district. In the regression analyses, a dummy variable – district – was incorporated into the model to control for any district specific fixed effects. Unfortunately, the ratio of intervention and comparison respondents in Kotido district was less ideal for reasons explained in the next subsection, with 82 intervention women and 77 comparison women interviewed.

6.2 Data Analysis

Data analysis was done centrally at OGB's head office.

OGB developed data entry tools in Adobe Acrobat Pro, and the Consultant recruited and supervised data entry clerks to enter the data. After identifying and rectifying some minor errors in MS Excel, the data were then imported into Stata for analysis, the results of which are presented in the following sections. Most of the analyses involved group mean comparisons using *t*-tests, as well as PSM with Stata's psmatch2 module and various regression approaches. Kernel and nearest neighbour matching without replacement were the main methods used in implementing PSM. Variables used in the matching process were identified by first using backwards stepwise regression to identify those variables that are correlated with the outcome measure of interest at *p*-values of 0.20 or less. The short-listed variables were then put into another stepwise regression model to identify those that are correlated with being a member of the intervention group. Covariate balance was checked following the implementation of each matching procedure. When covariate imbalance at *p*-values of 0.20 or less was identified, the bandwidth or calliper was reduced and the PSM procedure and covariate balance test implemented again. This was continued until all covariates were balanced at *p*-values greater than 0.20. Boot-strapped standard errors enabled the generation of confidence intervals to assess the statistical significance of the effect sizes. All the covariates, as presented in Table 7.1.1 below, were

[6] Given that unmatched comparison data is given less weight or is discarded altogether in PSM, it is preferable to have larger sample sizes for the comparison group.

included in the various regression approaches undertaken, i.e. regression with robust standard errors (to address issues of heteroskedasticity), robust regression (to reduce the influence of outliers), and regression with control functions (to attempt to control for relevant unobserved differences between the intervention and comparison groups).

6.3 Main Problems and Constraints Encountered

Overall, despite the usual hardships encountered when undertaking such intensive work, the data collection process went well. However, several challenges were encountered. These included:

- *Significant differences observed between the intervention and comparison groups, particularly in Kaabong district*. As is presented below, the comparison women interviewed in Kaabong district are different, on average, in many important ways. While these measured differences were controlled for during data analysis, it is likely that there are unobserved differences between the intervention and comparison groups of this district as well. The effect estimates presented below, therefore, must be interpreted cautiously.

- *Smaller size of comparison women interviewed in Kotido district than desired.* This was mentioned above. This resulted from two problems that emerged that disrupted the data collection process. These included a cattle raid that happened in one of the intervention villages and a food distribution exercise undertaken by another NGO. However, there were only a small number of observable differences found between the intervention and comparison groups of this district, so the smaller sample size obtained for the comparison group did not negatively affect the data analysis process as was initially feared.

7.0 Results

7.1 General Characteristics

The intervention and comparison women were found to be different in a number of important respects .

Table 7.1.1 presents mean statistics for general household characteristics obtained through the administration of the questionnaire among the sampled women from both the intervention and comparison groups. The stars beside the number indicate differences between the two groups that are statistically significant at a 90 percent confidence level or greater. As is evident, there are many statistically significant differences between the groups, including those related to:

- *Household size, including number of productive adults*.

Overall, the households of the intervention group are larger in size, with an average of approximately one additional member per household. The number of adults, including those who are productive, is also significantly greater. However, a breakdown by district reveals that these differences are only applicable to Kaabong district.

TABLE 7.1.1:
Descriptive Statistics: Intervention and Comparison Women Interviewed

	Overall mean	Inter. mean	Compar. mean	Dif.	*t*-stat.	Kat. dif.	*t*-stat.	Kab. dif.	*t*-stat.
HH size	6.7026	7.2553	6.2678	0.9875***	5.19	0.0247	0.08	1.456***	6.07
# of adults	3.0422	3.4574	2.7155	0.7420***	5.32	0.144	0.60	1.050***	6.25
# of children	3.6604	3.7979	3.5523	0.2456	1.29	-0.120	-0.41	0.406	1.62
HH female headed	0.1991	0.2447	0.1632	0.0815**	2.10	0.0255	0.40	0.119**	2.40
Respondent married	0.7377	0.7660	0.7155	0.0505	1.18	-0.0207	-0.29	0.0982*	1.80
Respondent age	36.9133	41.2660	33.4895	7.7764***	7.40	2.930*	1.77	10.26***	7.70
Elderly headed	0.0070	0.0053	0.0084	-0.0030	-0.37	0.0122	0.97	-0.0123	-1.15
Child headed	0.0023	0.0000	0.0042	-0.0042	-0.89	0	.	-0.00617	-0.81
Age of Head	43.7845	49.3883	39.3766	10.0117***	7.59	4.296*	1.97	12.83***	7.91
Head has secondary	0.0749	0.0372	0.1046	-0.0674***	-2.64	-0.00396	-0.10	-0.105***	-3.09
HH ethic minority	0.0187	0.0160	0.0209	-0.0050	-0.37	-0.0268	-1.07	0.00652	0.43
Productive adults	2.8876	3.2394	2.6109	0.6285***	4.78	0.104	0.46	0.891***	5.65
Unproductive adults	0.1405	0.2021	0.0921	0.1101***	2.86	0.0417	0.72	0.156***	3.03
# young children	2.5316	2.4894	2.5649	-0.0755	-0.45	-0.281	-1.06	0.0700	0.32
# dependents	2.6721	2.6915	2.6569	0.0346	0.21	-0.239	-0.92	0.226	1.04
# of adults with sec.	0.2014	0.1436	0.2469	-0.1032*	-1.88	-0.00554	-0.11	-0.132	-1.61
HH farms	0.9836	0.9947	0.9749	0.0198	1.60	0.0130	1.03	0.0214	1.16
HH rears livestock	0.5222	0.6383	0.4310	0.2073***	4.34	0.188**	2.42	0.254***	4.25
HH runs IGA	0.3232	0.4415	0.2301	0.2114***	4.75	0.0448	0.99	0.389***	6.74
HH does casual lab.	0.7658	0.8298	0.7155	0.1143***	2.79	-0.0303	-0.58	0.172***	3.04
HH does wage lab.	0.0796	0.0426	0.1088	-0.0662**	-2.52	-0.0283	-0.81	-0.0825**	-2.24
HH hunts	0.3677	0.4096	0.3347	0.0748	1.59	0.0192	0.26	0.133**	2.17
District centre far	0.0796	0.0745	0.0837	-0.0092	-0.35	0	.	0.00862	0.21
District centre close	0.0000	0.0000	0.0000	0.0000	.	0	.	0	.
District centre med.	0.9204	0.9255	0.9163	0.0092	0.35	0	.	-0.00862	-0.21
Sparsely populated	0.2319	0.2021	0.2552	-0.0531	-1.29	-0.295***	-4.31	0.0786	1.58
Asset poor baseline	0.3349	0.2394	0.4100	-0.1707***	-3.76	-0.0839	-1.12	-0.228***	-3.96
Asset mid baseline	0.3326	0.3617	0.3096	0.0521	1.13	-0.0336	-0.45	0.106*	1.81
Asset rich baseline	0.3326	0.3989	0.2803	0.1186***	2.60	0.118	1.57	0.122**	2.08
Bulls baseline	10.0539	8.8298	11.0167	-2.1869	-1.39	4.076***	3.22	-4.865**	-2.06
Cows baseline	11.6815	10.5000	12.6109	-2.1109	-1.01	4.122*	1.77	-5.496*	-1.81
Goats baseline	20.1733	14.2553	24.8285	-10.5731**	-2.47	0.876	0.36	-15.61**	-2.33
Sheep baseline	16.5855	10.2660	21.5565	-11.2905***	-2.83	0.561	0.25	-16.89***	-2.71
Herd size baseline	58.4941	43.8511	70.0126	-26.1615**	-2.37	9.635	1.42	-42.87**	-2.51
N	**427**	**188**	**239**			**159**		**268**	

* p<0.10, ** p<0.05, *** p<0.01

- *Sex of household head.*

A greater proportion of households in the intervention group are also female headed, with this difference being overall approximately eight percent greater. However, again, this difference only applies to Kaabong district.

- *Age of respondent and household head.*

Both the ages of the respondent and household head are greater, and these differences are statistically significant for both districts, albeit with this difference being significantly greater for Kaabong.

- *Education levels.*

A household head in Kaabong district is more likely to have had at least secondary education, but the percentage is still quite low.

- *Occupations of household members.*

Households of the intervention group are more likely to rear livestock, run off-farm income generating activities, and engage in casual labour and less likely to engage in wage labour.

- *Population density.*

Members of the intervention group of Kotido district are less likely to reside

in sparsely populated areas.

- *Baseline wealth status, including livestock ownership.* The intervention group is both more likely to be in the asset rich group at baseline and less likely to be in the asset poor group. The women of the Kaabong intervention group were also less likely to keep large numbers of livestock at baseline.

7.2 Intervention Exposure

As mentioned above, the respondents were asked a number of questions about the extent they were exposed to the OGB supported interventions. There was, however, no reference in the questionnaire as to whether the support came from OGB or not. Figure 7.2.1 presents the percentage of respondents that reported making use of particular types of support provided by external organisations. As is apparent, for the use of dams, veterinary services, and grain storage facilities, there are large differences between the women of the intervention and comparison groups. Women associated with the former, in particular, reported having been exposed to such interventions to a much greater extent. As is apparent from the statistics presented in Table 7.2.1, these differences, overall, are highly statistically significant. However, the only difference that is statistically significant for Kotido district is associated with the use of grain storage facilities, where there is a 33 percent difference between the intervention and comparison women. The difference is very large and highly statistically significant in all three areas for the OGB supported women groups of Kaabong district. There is, however, no overall difference in the percentage of women who reported accessing loans from their respective income generation groups. However, there is a statistically significant difference when Kotido district is examined in isolation.

The supported women reported receiving more support in all areas, save for loans to support income generating activities .

Table 7.2.2 shows the percentage of respondents who reported directly receiving other specific forms of support from external organisations. As is apparent, the intervention groups from both districts reported receiving a greater degree of this support than did the comparison women. Table 7.2.3 presents these same data but in relation to such things as the number of times the support was accessed. The women of the intervention group were clearly exposed to most of the interventions associated with the North Karamoja Development Project to a greater degree than those of the comparison group.

FIGURE 7.2.1:
% of HHs reporting that they at least sometimes use structures or services supported by external organisations

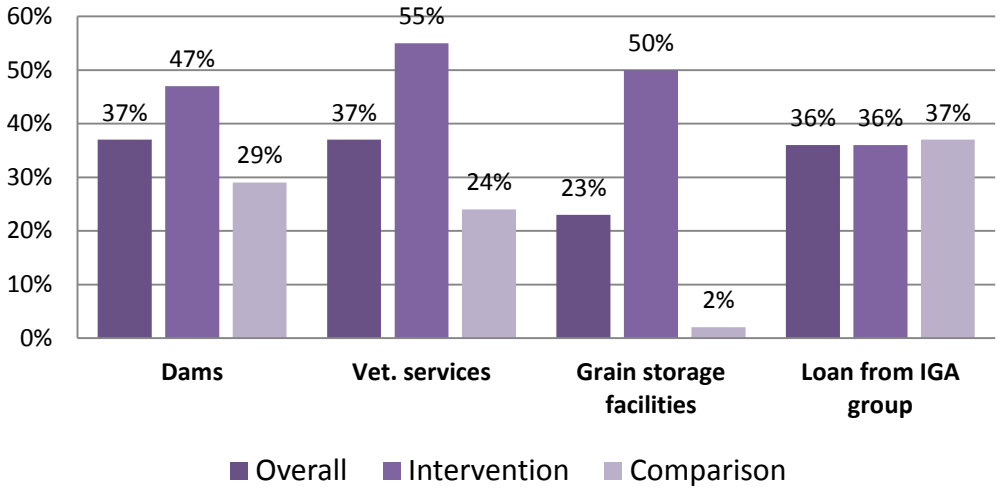


TABLE 7.2.1:
Differences in proportions of HHs reporting that they often or always use particular structures/services supported by external organisations

	Overall	Intervention	Comparison	Overall Difference	Kotido Difference	Kaabong Difference
Dams	0.37	0.47	0.29	0.183***	0.0754	0.263***
				(3.95)	(1.00)	(4.47)
Vet. services	0.37	0.55	0.24	0.307***	0.00673	0.500***
				(6.83)	(0.09)	(9.54)
Grain storage facilities	0.23	0.50	0.02	0.486***	0.331***	0.601***
				(14.27)	(5.66)	(14.97)
Loans from IGA group	0.36	0.36	0.37	-0.0118	0.119*	-0.0185
				(-0.25)	(2.39)	(-0.30)
Observations	**427**	**188**	**239**	**427**	**159**	**268**

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 7.2.2:
Differences in receipt of support provided since 2006 from external organisations

	Overall	Intervention	Comparison	Overall Difference	Kotido Difference	Kaabong Difference
Farming inputs	0.81	0.88	0.75	0.130***	0.589***	0.442**
				(3.44)	(4.01)	(3.07)
Farming implements	0.75	0.93	0.62	0.306***	0.367*	0.626***
				(7.18)	(2.54)	(5.52)
Cattle	0.11	0.19	0.05	0.145***	0.110*	-0.0516
				(3.80)	(2.32)	(-1.21)
Goats and sheep	0.34	0.69	0.06	0.629***	0.369***	1.026***
				(15.24)	(4.09)	(14.92)
Donkeys	0.10	0.21	0.01	0.204***	0.145**	0.0283*
				(5.70)	(2.90)	(2.16)
Animal husbandry training	0.39	0.58	0.23	0.345***	0.539	0.459**
				(6.94)	(1.65)	(3.02)
Observations	**427**	**188**	**239**	**427**	**159**	**268**

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 7.2.3:
Differences in average number of items provided since 2006 from external organisations

	Overall	Inter.	Com.	Overall Difference	Kotido Dif.	Kaabong Dif.
# of times receiving farming inputs	1.38	1.64	1.18	0.468***	0.101	0.156**
				(4.44)	(1.57)	(3.31)
# of times receiving farm implements	1.12	1.42	0.89	0.529***	0.238**	0.335***
				(5.97)	(3.28)	(6.33)
# of cattle received	0.07	0.07	0.07	0.00752	0.390***	-0.0302
				(0.23)	(4.57)	(-1.05)
# of goats and sheep received	0.40	0.82	0.07	0.753***	0.527***	0.680***
				(13.23)	(5.89)	(17.64)
# of donkeys received	0.04	0.09	0.01	0.0821***	0.425***	0.0283*
				(3.94)	(4.94)	(2.16)
# of HH m trained in animal husbandry	0.72	1.03	0.49	0.541***	0.341***	0.295***
				(3.49)	(3.60)	(5.65)
Observations	**427**	**188**	**239**	**427**	**159**	**268**

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.3 Differences between the Intervention and Comparison Groups on the Outcome Measures

This subsection presents the results of analyses that compared the overall of households residing in the intervention and comparison villages. Both the unadjusted and adjusted results are presented in each of the tables below.

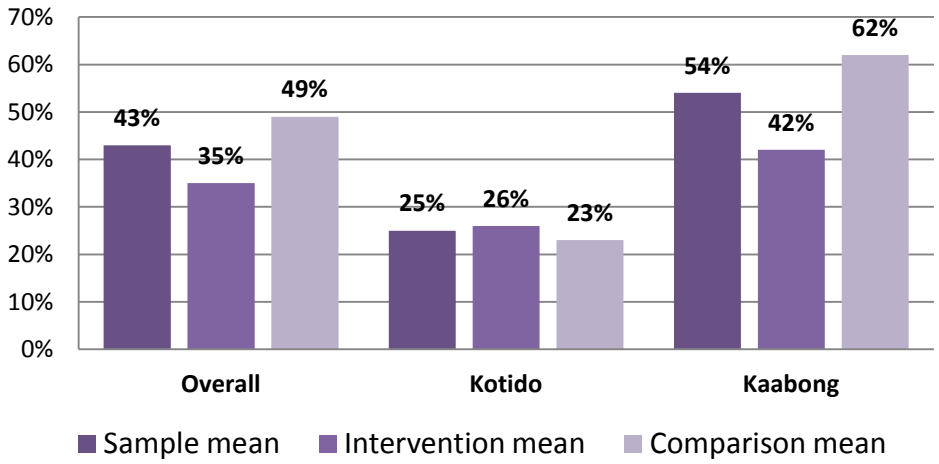
7.3.1 Measures of Household Wealth

Before controlling for differences between the groups, the intervention group is actually worse off in relation to the global OGB livelihood indicator .

- **Household Consumption and Expenditure**

Figure 7.3.1.1 displays the results of the comparison between the intervention and comparison groups in terms of the OGB global livelihood outcome indicator – % of households living above £1.00 per capita per day – adjusted for purchase power parity (PPP). As is evident, there is an overall difference between the intervention and comparison groups, with a 14 percent difference in favour of the latter. Disaggregating these figures by district reveals an interesting picture, however: The difference is minimal for Kotido district and quite large (20 percent) in Kaabong district. As such, at least before controlling for observable differences between the groups, there is a large and negative difference overall, which is influenced by an even larger negative difference in Kaabong district. Table 7.3.1.1 presents the results of the statistical tests that were used in the comparison of the intervention and comparison women. As is evident, before controlling for the measured differences between the groups, the overall negative difference is statistically significant. However, the results associated with the two PSM and two regression procedures that were implemented to control for these differences water down this difference. While the overall differences are still large (ranging from eight to 10 percent) and in an undesirable direction, they are no longer statistically significant. Nevertheless, all the adjusted results for Kaabong district remain strong, negative, and statistically significant.

FIGURE 7.3.1.1:
Comparison of Intervention and Comparison Groups in Relation to Those Living Above £1.00 Per Capita Per Day (PPP) - Unadjusted



After controlling for the differences, the overall difference is not statistically significant, but it is still significant and negative for Kaabong .

TABLE 7.3.1.1:
Comparison of Intervention and Comparison Groups in Relation to Those Living Above £1.00 Per Capita Per Day (PPP)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.43	0.25	0.54
Intervention mean:	0.35	0.26	0.42
Comparison mean:	0.49	0.23	0.62
Unadjusted difference :	-0.148***	0.022	-0.202***
	(-3.07)	(0.33)	(-3.23)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-0.0800	0.0191	-0.176**
(kernel)	(-1.45)	(0.28)	(-2.09)
Observations:	**389**	**152**	**237**
Post-matching difference:	-0.0955	0.0260	-0.173**
(no replacement)	(-1.53)	(0.38)	(-2.06)
Observations:	**393**	**159**	**234**
Multivariable Regression:			
MVR coefficient (fe; dprobit):	-.0903135	.07509	-.2571119***
	(-1.37)	(1.10)	(-2.85)
Observations:	**389**	**152**	**234**
MVR coefficient (fe; dprobit):	-0.103	0.070	-0.285***
with control functions	(-1.58)	(0.98)	(-3.03)
Observations:	**383**	**149**	**234**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

The data associated with the household consumption and expenditure indicator can also be analysed in its continuous form. It is generally recommended that such data be placed on a logarithmic scale to both ensure that the data better take the shape of a normalised distribution and reduce the influence of influential observations that can result in misleading conclusions. As such, the intervention and comparison groups were compared in relation to household consumption and expenditure data transformed in this way. As is evident from Table 7.3.1.2, the unadjusted results are very similar as those of the binary version of this measure in terms of statistical significance. However, the adjusted results are particularly interesting. This is especially true for the PSM results, given that the difference associated with Kaabong in favour of the comparison group is now no longer statistically significant. The regression estimates, however, remain so.

When the consumption and expenditure data are analysed in their continuous form, the apparent differences between the groups diminishes further.

TABLE 7.3.1.2:
Comparison of Intervention and Comparison Groups in Relation to Household Consumption and Expenditure (Logarithmic Scale)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	7.06	6.71	7.27
Intervention mean:	6.93	6.71	7.09
Comparison mean:	7.17	6.72	7.38
Unadjusted difference :	-0.240***	-0.00262	-0.289***
	(-3.36)	(-0.02)	(-3.57)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0110	0.104	-0.0745
(kernel)	(0.10)	(0.86)	(-0.43)
Observations:	**410**	**159**	**251**
Post-matching difference:	-0.129	0.00952	-0.149
(no replacement)	(-1.30)	(0.08)	(-1.32)
Observations:	**395**	**159**	**236**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.0736	0.0848	-0.217**
	(-0.53)	(0.68)	(-2.02)
Observations:	**410**	**159**	**251**
MVR coefficient (rreg):	-0.109	-0.0677	-0.230**
	(-1.56)	(-0.68)	(-2.28)
Observations:	**410**	**159**	**251**
MVR coefficient (robust):	-0.0947	0.0822	-0.271**
with control functions	(-0.55)	(0.66)	(-2.44)
Observations:	**395**	**156**	**239**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

Where possible, efforts were made to obtain household expenditure data on items that can be sensibly divisible along gender lines, e.g. money spent on men/boys and women/girls clothes. This was to measure the extent to which there is gender inequality in relation to household spending in general and

whether there is a difference in gender divisible spending between the intervention and comparison groups. The results of the relevant analyses are presented in Table 7.3.1.3. No difference was found between the intervention and comparison groups, both before and after statistical adjustment through both PSM and MVR. Interestingly, however, in Kaabong district at least, there appears to be spending inequality along gender lines in favour of women, i.e. the women from *both* the intervention and comparison groups, on average, reported that more money was being spent on women/girls of their households on such items. However, this may be simply a reflection of the fact that women were interviewed, and they may have been unaware of some of the male-related purchasing that went on in their respective households.

No difference was found between the groups in relation to gender-based intra-household spending inequality.

TABLE 7.3.1.3:
Comparison of Intervention and Comparison Groups in Relation to Differences in Monthly Expenditure Between Women and Men on Gender Divisible Items (logarithmic scale)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.30	-0.01	0.49
Intervention mean:	0.19	-0.01	0.34
Comparison mean:	0.39	-0.02	0.59
Unadjusted difference :	-0.205	0.0159	-0.252
	(-0.96)	(0.07)	(-0.83)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0378	-0.00363	0.0792
(kernel)	(0.17)	(-0.01)	(0.22)
Observations:	**403**	**159**	**244**
Post-matching difference:	-0.0122	-0.0169	0.0751
(no replacement)	(-0.05)	(-0.07)	(0.20)
Observations:	**403**	**159**	**244**
Multivariable Regression:			
MVR coefficient (fe; robust):	0.123	-0.0746	0.466
	(0.59)	(-0.29)	(1.09)
Observations:	**403**	**159**	**244**
MVR coefficient (rreg):	0.107	0.0963	0.0945
	(0.78)	(0.52)	(0.42)
Observations:	**403**	**159**	**244**
MVR coefficient (robust):	0.222	-0.0701	0.405
with control functions	(0.80)	(-0.28)	(0.94)
Observations:	**395**	**157**	**238**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

- **Household Asset Ownership**

Data collected on 39 wealth assets were converted into a household asset index to draw out relative differences in wealth between households.

As explained above, another approach to measuring household wealth status is by examining the basket of assets a household owns. Households that are wealthy tend to have more tangible material possessions or other locally relevant wealth indicators, e.g. livestock, tin roofs (as opposed to grass), bicycles, radios, cemented floors (as opposed to dirt), etc. Efforts were therefore made to capture data on household wealth indicators, particularly on those assumed relevant for differentiating the better and worse off in the intervention and comparison communities. Respondents were asked to report on the various wealth indicators for both the present time, as well as for baseline period, thereby, attempting to reconstruct baseline data. The specific household wealth indicators are presented in Table 7.3.1.5. Where sensible, efforts were made to capture not only whether the household had the asset in question, but also the specific number owned. In addition, for indicators relating to the material used to construct specific features of the respondents' homes, scores were allocated depending on the material in question. For example, 0 points was given for respondents reporting the floor of their homes were made of dirt, 1 point if it was made from cement or unfinished wood, and 2 points for tiles, vinyl, or finished wood.

The numbers of assets owned were then grouped into three quantiles to avoid the analysis being overly influenced by extreme values. PCA was then run on all the wealth indicators presented in Table 7.3.1.5, and an asset index was created based on the first principal component that was generated. This was done for both sets of indicators associated with the endline and baseline periods. For the purposes of one of the analyses performed, this index was divided into two quantiles to create two groups, i.e. those that are relatively more asset rich and poor.

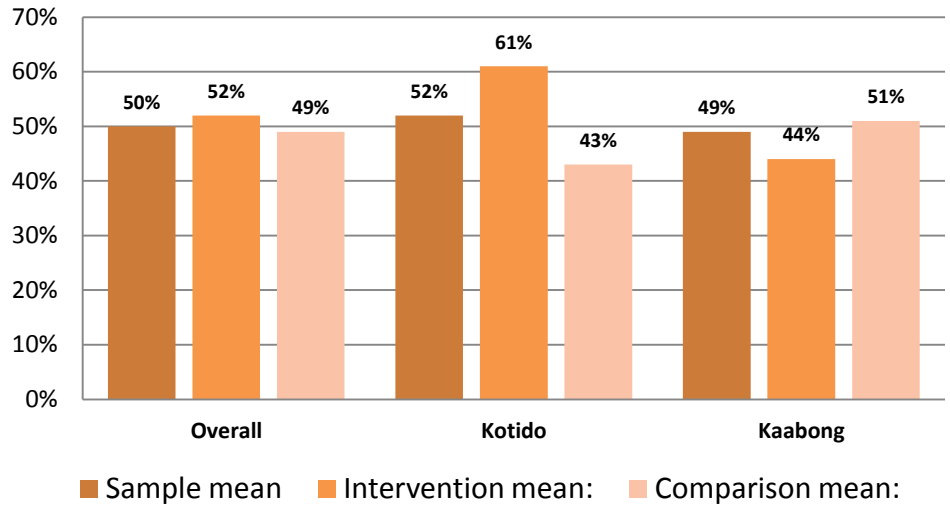
TABLE 7.3.1.5:
List of Assets and Other Wealth Indicators Used in the Measurement of HH Asset Ownership

Electricity (inc. solar/generator)	Hoe	Plough (plow)
Iron sheet door	Bed	Independent corral
Lamps – electric, kerosene or other	Shovel	Ox/horse/ donkey/bull drown cart
Granary	Mobile phone	Physical structure of home
Television	Tarpaulin (plastic sheet)	Principal cooking fuel used
Saucepan	Bicycle	Toilet type
Clocks/watch	Hot water flask	Material of floors of home
Jerry can	Wheel borrow	Material of walls of home
Table	Off-farm IGA, e.g. kiosk/shop	Material of roof of home
Gold or silver jewellery	Sewing machine	Material of fence of home
Radios/cassette/CD player	Livestock watering pan	Hectares of land used for cultivation
Axe or machete	Mechanical milling machine	Number of rooms in home
Mattress	Livestock salt pan	Method used to till land

The results of the analysis are presented in Table 7.3.1.6 below. As is apparent, overall, women of the intervention groups are not more likely to belong to the relatively more asset rich group. However, a different picture is revealed when the districts are examined separately. In Kotido district there is a significant difference, with over 18 percent being more likely to belong to the richer group. The results for Kaabong district are mixed: The PSM estimates indicate no statistically significant differences between the

intervention and comparison groups but the regression estimates indicate that the intervention group is actually worse off.

FIGURE 7.3.1.2:
Comparison of Intervention and Comparison Groups in Relation to Whether they Belong to the Asset Rich Group - Unadjusted



Overall, no asset wealth differences were found. However, the Kotido intervention women are more asset rich than their comparators.

TABLE 7.3.1.6:
Comparison of Intervention and Comparison Groups in Relation to Whether They Belong to the Asset Rich Group

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.50	0.52	0.49
Intervention mean:	0.52	0.61	0.44
Comparison mean:	0.49	0.43	0.51
Unadjusted difference :	.0306018	0.181**	-0.070
	(0.63)	(2.28)	(-1.10)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0286	0.207**	-0.113
(kernel)	(0.48)	(2.30)	(-1.48)
Observations:	**420**	**158**	**262**
Post-matching difference:	0.0440	0.195**	-0.0500
(no replacement)	(0.83)	(2.38)	(-0.67)
Observations:	**419**	**159**	**260**
Multivariable Regression:			
MVR coefficient (fe; dprobit):	0.006	0.277***	-0.349***
	(0.10)	(3.03)	(-3.57)
Observations:	**418**	**152**	**261**
MVR coefficient (fe; dprobit):	0.010	0.283***	-0.374***
with control functions	(0.15)	(3.08)	(-3.62)
Observations:	**410**	**152**	**258**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

Analyses of the data in their continuous form show that the Kotido and Kaabong intervention women are richer and poorer in asset wealth than their comparators, respectively.

Table 7.3.1.7 reveal the results of a similar statistical analysis. However, this time the outcome measure is left in its continuous form. The pattern of results is similar: no overall difference between the intervention and comparison groups but a positive and statistically significant difference for Kotido and the reverse being the case for Kaabong. Can we, therefore, conclude that the support provided by OGB to the women's groups resulted in the Kotido women becoming more asset rich and the Kaabong women becoming asset poorer? Fortunately, given that recalled baseline data exist, we are able to explore this in a more reliable manner. Specifically, we can look at the average change in asset ownership that took place from the baseline period between the groups. Table 7.3.1.8 presents the results of this analysis. Overall, there is still no significant difference between the intervention and comparison groups. Moreover, the positive effect estimates for Kotido district are no longer statistically significant. However, those for Kaabong remain negative and statistically significant.

TABLE 7.3.1.7:
Comparison of Intervention and Comparison Groups in Relation to Asset Index (Principal Component Analysis)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-0.00	-0.00	-0.00
Intervention mean:	-0.18	0.24	-0.50
Comparison mean:	0.14	-0.26	0.33
Unadjusted difference :	-0.318	0.496	-0.830**
	(-1.42)	(1.30)	(-3.26)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0132	0.800**	-0.612**
(kernel)	(0.06)	(2.53)	(-1.98)
Observations:	**420**	**158**	**262**
Post-matching difference:	-0.0391	0.560	-0.328
(no replacement)	(-0.16)	(1.45)	(-1.22)
Observations:	**419**	**159**	**260**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.120	0.687**	-0.656**
	(-0.21)	(2.30)	(-2.55)
Observations:	**420**	**158**	**262**
MVR coefficient (rreg):	-0.0729	0.788***	-0.618***
	(-0.48)	(3.59)	(-3.06)
Observations:	**419**	**157**	**262**
MVR coefficient (robust):	-0.0568	0.676**	-0.863***
with control functions	(-0.08)	(2.29)	(-3.64)
Observations:	**414**	**156**	**258**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

When the differences in asset ownership over time are compared, the Kotido intervention women are now no better off, but the Kaabong intervention women are still worse off.

TABLE 7.3.1.8:
Comparison of Intervention and Comparison Groups in Relation to Asset Index Difference in Differences (Principal Component Analysis)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.00	0.00	0.00
Intervention mean:	-0.32	0.10	-0.65
Comparison mean:	0.25	-0.10	0.42
Unadjusted difference:	-0.577**	0.197	-1.069***
	(-2.79)	(0.55)	(-4.52)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-0.374*	0.304	-0.903***
(kernel)	(-1.68)	(0.88)	(-3.43)
Observations:	**426**	**159**	**267**
Post-matching difference:	-0.269	0.239	-0.603**
(no replacement)	(-1.01)	(0.68)	(-2.54)
Observations:	**398**	**159**	**239**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.179	0.457	-0.698**
	(-0.38)	(1.28)	(-2.53)
Observations:	**426**	**159**	**267**
MVR coefficient (rreg):	-0.146	0.490	-0.550***
	(-0.91)	(1.51)	(-3.21)
Observations:	**426**	**159**	**265**
MVR coefficient (robust):	-0.200	0.459	-0.946***
with control functions	(-0.31)	(1.29)	(-3.83)
Observations:	**417**	**157**	**260**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

- **Perceived Ability to Meet Household Needs**

During the interviewing process, the women respondents were also asked to rank themselves in relation to how well their households were doing with respect to meeting basic needs. In particular, the following statements were read out to them, and they were asked to state which option best applies to their respective households.

1. "Doing well: able to meet household needs by your own efforts, and making some extra for stores, savings, and investment."
2. "Breaking even: Able to meet household needs but with nothing extra to save or invest."

3. "Struggling: Managing to meet household needs, but depleting productive assets and/or sometimes receiving support."
4. "Unable to meet household needs by your own efforts: dependent on support from relatives living outside of your household or the community, government and/or some other organisation – could not survive without this outside support."

Based on these responses, a variable was created to differentiate those that ranked themselves as being in first or second category. The unadjusted results are presented in Figure 7.3.1.3 below. As is apparent, there is a large overall difference: 35 percent of the intervention group respondents reported being able to at least meet their basic needs, compared to 55 percent for the comparison group. There are also interesting differences between the districts. The difference between the intervention and comparison groups is very large and in a negative direction in Kaabong district. There is also only a small, albeit positive difference, for Kotido distirct. Moreover, far fewer women in Kotido district in both groups reported being in a position to meet household needs compared with those of Kaabong.

FIGURE 7.3.1.3:
Comparison of Intervention and Comparison Groups in Relation to Perceived Ability to At Least Meet Basic Household Needs - Unadjusted

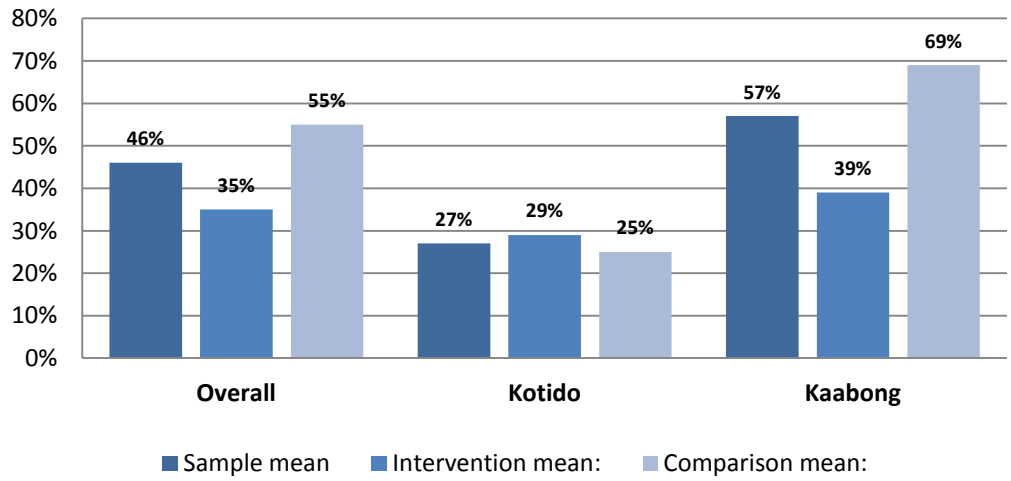


Table 7.3.1.9 presents the results of the various statistical procedures that were used. After controlling for observable differences between the groups, the overall differences associated with the different procedures are still negative and statistically significant. However, this is entirely due to data associated with Kaabong district, where the difference is much larger.

Overall, the women of the intervention group said they were less able to meet households needs than the comparison women. This is particularly true for Kaabong district.

TABLE 7.3.1.9:
Comparison of Intervention and Comparison Groups in Relation to Perceived Ability to At Least Meet Basic Household Needs or Making Extra

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.46	0.27	0.57
Intervention mean:	0.35	0.29	0.39
Comparison mean:	0.55	0.25	0.69
Unadjusted difference :	-0.1968***	0.0459	-0.2952***
	(-4.03)	(0.65)	(-4.70)
Observations:	**424**	**159**	**265**
PSM (ATT)			
Post-matching difference:	-0.0972*	0.0446	-0.214***
(kernel)	(-1.69)	(0.59)	(-2.72)
Observations:	**413**	**157**	**256**
Post-matching difference:	-0.117*	0.0390	-0.237***
(no replacement)	(-1.96)	(0.55)	(-3.07)
Observations:	**397**	**159**	**238**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.1519**	0.0351	-0.0294***
	(-2.58)	(0.51)	(-3.37)
Observations:	**413**	**157**	**252**
MVR coefficient (robust):	-0.1191*	0.04112	-0.3003***
with control functions	(-1.88)	(0.59)	(-3.38)
Observations:	**409**	**157**	**252**

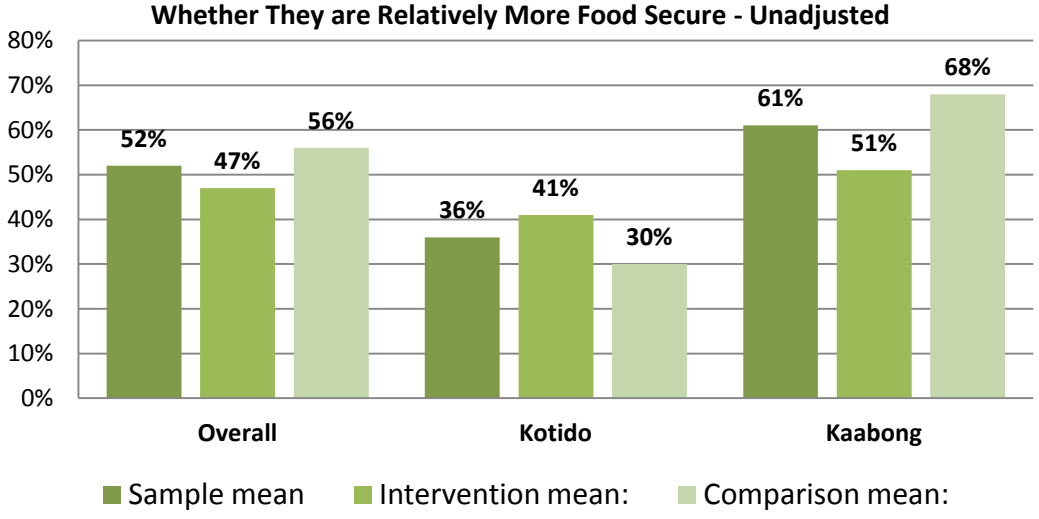
t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
PSM estimates bootstrapped 1000 repetitions

7.3.2 Measures of Household Food Security

As mentioned above, one of the intended impacts of the support being provided to the women's groups is to improve household food security. The Food, Agriculture, and Nutrition Technical Assistance (FANTA) Project's Household Food Insecurity Access Scale (HFIAS) was one of the key measures used to assess whether the support being provided to the women's groups is having a positive effect. The more points that are scored on the scale, the more food insecure the household in question is deemed to be. The data obtained through the incorporation of the scale in the administered questionnaire were analysed in both binary and continuous forms. For the binary analysis, a household that scored below nine points was classified as being more food secure, with the reverse being the case for those at or exceeding this threshold. Figure 7.3.2.1 presents the unadjusted statistics. The pattern is similar to the other outcome measures presented above. The results of the relevant statistical analyses are presented in Table 7.3.2.1. Overall, there is no difference between the intervention and comparison groups. However, there does appear to be modest difference for Kotido

district, which is statistically significant across three of the four estimation techniques. The unadjusted negative effect for Kaabong is also rendered insignificant.

FIGURE 7.3.2.1
Comparison of Intervention and Comparison Groups in Relation to Whether They are Relatively More Food Secure - Unadjusted



Overall, women of the intervention group were not found to be more food secure. However, some statistically significant and positive differences were found for Kotido.

TABLE 7.3.2.1:
Comparison of Intervention and Comparison Groups in Relation to Whether They are Relatively More Food Secure

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.52	0.36	0.61
Intervention mean:	0.47	0.41	0.51
Comparison mean:	0.56	0.30	0.68
Unadjusted difference :	-0.0884*	0.1159	-0.170***
	(-1.81)	(1.52)	(-2.77)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0331	0.116	-0.0368
(kernel)	(0.53)	(1.49)	(-0.42)
Observations:	**417**	**159**	**258**
Post-matching difference:	-0.00629	0.130*	-0.0909
(no replacement)	(-0.10)	(1.80)	(-1.02)
Observations:	**396**	**159**	**237**
Multivariable Regression:			
MVR coefficient (fe; dprobit):	-0.0356	0.1675**	-0.0649
	(-0.62)	(2.06)	(-0.81)
Observations:	**415**	**157**	**253**
MVR coefficient (fe; dprobit):	.0575	0.1602**	-0.0727
with control functions	(0.93)	(2.00)	(-0.90)
Observations:	**410**	**157**	**253**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

Table 7.3.2.2 presents the results of an analysis of this measure where PCA was used to narrow in on the way the respondents responded differently to the scale. The results are qualitatively similar to those presented in Table 7.3.2.1. However, the adjusted results are all statistically significant at a 90% confidence level or higher for Kotido, i.e. the women from the intervention group of this district were less likely to report having problems accessing food in their homes.

Intervention women from Kotido district indicate being less food insecure that their comparators, a difference that is statistically significant across all estimation procedures at the 90% level or higher.

TABLE 7.3.2.2:
Comparison of Intervention and Comparison Groups in Relation to HH Food Insecurity Score (Principal Component Analysis)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.00	-0.00	0.00
Intervention mean:	0.03	-0.23	0.23
Comparison mean:	-0.02	0.25	-0.15
Unadjusted difference :	0.0486	-0.481	0.378**
	(0.29)	(-1.62)	(1.99)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-0.267	-0.541*	-0.0374
(kernel)	(-1.28)	(-1.69)	(-0.12)
Observations:	**417**	**159**	**258**
Post-matching difference:	-0.111	-0.537*	0.175
(no replacement)	(-0.51)	(-1.85)	(0.62)
Observations:	**396**	**159**	**237**
Multivariable Regression:			
MVR coefficient (fe; robust):	0.0126	-0.647**	0.0129
	(0.08)	(-2.25)	(0.05)
Observations:	**417**	**159**	**258**
MVR coefficient (rreg):	0.0729	-0.629*	0.270
	(0.38)	(-1.86)	(1.12)
Observations:	**417**	**159**	**258**
MVR coefficient (robust):	-0.330	-0.642**	0.00500
with control functions	(-1.04)	(-2.22)	(0.02)
Observations:	**410**	**157**	**253**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

The women were also asked questions related to the number of times they ate during the previous day and the number of different food item types they consumed. The results for both are presented in Table 7.3.2.3 and Table 7.3.2.4, respectively. Overall, the interviewed women reported having had eaten an average of 2.34 times during the previous day, and the average for the women of the intervention group was 2.21 and 2.45 for the comparison. This difference does not appear large but the statistical significance of the difference holds for two out of the five of the statistical adjustment procedures. Again, the women of Kotido district, whether in the intervention group or not, reported eating less than their Kaabong based counterparts.

The women of the intervention group actually reported eating fewer times during the previous day than the comparison women, with this being statistically significant for three out of the five estimation methods.

TABLE 7.3.2.3:
Comparison of Intervention and Comparison Groups – Number of Pervious Day Feedings

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	2.34	2.14	2.47
Intervention mean:	2.21	2.00	2.38
Comparison mean:	2.45	2.29	2.52
Unadjusted difference :	-0.235***	-0.286*	-0.147
	(-2.87)	(-1.96)	(-1.53)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-0.128	-0.126	-0.129
(kernel)	(-1.45)	(-0.83)	(-1.26)
Observations:	**423**	**159**	**264**
Post-matching difference:	-0.259***	-0.286*	-0.202*
(no replacement)	(-2.60)	(-1.93)	(-1.70)
Observations:	**403**	**159**	**244**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.160*	-0.192	-0.162
	(-1.79)	(-1.20)	(-1.37)
Observations:	**423**	**159**	**264**
MVR coefficient (rreg):	-0.123	-0.208	-0.121
	(-1.37)	(-1.53)	(-0.95)
Observations:	**423**	**159**	**264**
MVR coefficient (robust):	-0.202**	-0.203	-0.213*
with control functions	(-2.10)	(-1.27)	(-1.76)
Observations:	**398**	**157**	**241**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

The women were also asked about whether they consumed any of the following food items during the previous day: grains, roots/tubers, vegetables, fruits, meat, fish, and legumes. As is presented below, the overall average was close to three of these items. Overall, there are no statistically significant differences between the intervention and comparison groups.

Women of both the intervention and comparison groups were found to have eaten about the same varieties of foods during the previous day.

TABLE 7.3.2.4:
Comparison of Intervention and Comparison Groups in Relation to Diversity of Food Items Consumed in Previous Day

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	2.93	2.70	3.07
Intervention mean:	2.96	2.62	3.23
Comparison mean:	2.91	2.79	2.97
Unadjusted difference :	0.0506	-0.170	0.257*
	(0.45)	(-1.10)	(1.68)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.120	-0.178	0.401*
(kernel)	(0.87)	(-1.13)	(1.81)
Observations:	**406**	**158**	**248**
Post-matching difference:	-0.0736	-0.143	0.0741
(no replacement)	(-0.61)	(-0.97)	(0.40)
Observations:	**402**	**159**	**243**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.0592	-0.129	-0.0740
	(-0.49)	(-0.74)	(-0.35)
Observations:	**406**	**158**	**248**
MVR coefficient (rreg):	-0.0793	-0.199	-0.0206
	(-0.68)	(-1.34)	(-0.11)
Observations:	**405**	**157**	**248**
MVR coefficient (robust):	-0.0970	-0.139	-0.0574
with control functions	(-0.75)	(-0.80)	(-0.27)
Observations:	**398**	**156**	**242**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

7.3.3 Livestock and Agricultural Production

As presented above, much of the livelihood support that is being provided by OGB is attempting to improve livestock health, bolster agricultural production, and increase income from the sale of both livestock products and crops. However, as also explained above, the context in which the support is being provided is a very challenging one. Anecdotally, it became clear to the research team that the livelihoods of the people in both Kotido and Kaabong districts had been in a state of significant decline for several years preceding the data collection exercise. One interesting variable to examine is changes in the numbers of livestock kept over time. If the OGB animal husbandry support is actually effective, there should be less livestock loss among the women of the intervention groups, all other things being equal. Table 7.3.3.1 presents the results in relation to overall herd size. As is apparent, the women reported – through the randomised response technique – as having, on average, approximately 50 head of livestock less than during the baseline period. Moreover, the number lost is more significant in the case of the comparison group. However, the overall difference only remains statistically

significant for one adjusted estimate. However, a different picture emerges in the case of Kaabong district, where three out of the four adjusted estimates remain significant. It, therefore, appears that the households in which women of the intervention group of Kaabong district reside experienced less livestock loss than their comparators.

Overall, livestock loss was about the same for both intervention and comparison group. However, the intervention women in Kaabong reported less loss than their comparators.

TABLE 7.3.3.1:
Comparison of Intervention and Comparison Groups: Difference in Herd Size Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-50.29	-33.22	-60.42
Intervention mean:	-37.31	-35.73	-38.53
Comparison mean:	-60.50	-30.55	-74.74
Unadjusted difference :	23.19**	-5.186	36.21***
	(2.52)	(-0.79)	(2.77)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	45.01**	2.956	82.05*
(kernel)	(1.98)	(0.36)	(1.95)
Observations:	**406**	**157**	**249**
Post-matching difference:	11.71	-5.987	29.85
(no replacement)	(1.01)	(-0.94)	(1.20)
Observations:	**377**	**159**	**218**
Multivariable Regression:			
MVR coefficient (fe; robust):	26.11	-1.378	59.15***
	(0.96)	(-0.19)	(2.87)
Observations:	**406**	**157**	**249**
MVR coefficient (robust):	29.59	-1.400	58.44***
with control functions	(0.95)	(-0.19)	(2.74)
Observations:	**406**	**157**	**249**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

Table 7.3.3.2 and Table 7.3.3.3 present results for changes in cattle and goats/sheep ownership only. Again, there is a reduction over time for both groups. However, the women of the intervention group from Kaabong district reported experiencing less of a loss for both types of livestock.

The respondents were also asked – this time directly rather than through the randomized response model – how many livestock they had lost *specifically due to disease* over the last two years. If the animal health and related support made a difference, it is assumed that women from the intervention group should report having lost less livestock due to disease. However, as is apparent from the statistics presented in Table 7.2.3.4, this is not the case. On average, the women reported losing about 10 heads of livestock, and there is no significant difference among the districts or between the intervention and comparison groups.

The Kaabong intervention women appear to have lost less cattle and goats and sheep when the relevant data are analysed separately.

TABLE 7.3.3.2:
Comparison of Intervention and Comparison Groups in Relation to Changes in Average Number of Cattle Owned Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-18.81	-13.92	-21.71
Intervention mean:	-16.61	-17.18	-16.17
Comparison mean:	-20.54	-10.45	-25.34
Unadjusted difference :	3.932	-6.728**	9.170**
	(1.35)	(-1.98)	(2.36)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	9.331**	-2.199	19.48***
(kernel)	(2.19)	(-0.60)	(2.85)
Observations:	**406**	**157**	**249**
Post-matching difference:	0.343	-7.338**	8.525
(no replacement)	(0.09)	(-2.16)	(1.29)
Observations:	**377**	**159**	**218**
MVR coefficient (robust):	5.666	-5.099	15.66***
with control functions	(0.53)	(-1.30)	(3.40)
Observations:	**406**	**157**	**249**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

TABLE 7.3.3.3:
Comparison of Intervention and Comparison Groups in Relation to Changes in Average Number of Goats and Sheep Owned Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-31.48	-19.30	-38.71
Intervention mean:	-20.70	-18.55	-22.36
Comparison mean:	-39.96	-20.09	-49.40
Unadjusted difference :	19.26***	1.542	27.04***
	(2.84)	(0.39)	(2.78)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	35.68*	5.155	62.56*
(kernel)	(1.92)	(1.03)	(1.83)
Observations:	**406**	**157**	**249**
Post-matching difference:	11.37	1.351	21.33
(no replacement)	(1.33)	(0.35)	(1.07)
Observations:	**377**	**159**	**218**
Multivariable Regression:			
MVR coefficient (fe; robust):	21.51	3.752	43.31**
	(1.23)	(0.83)	(2.56)
Observations:	**406**	**157**	**249**
MVR coefficient (robust):	23.92	3.699	42.77**
with control functions	(1.18)	(0.80)	(2.41)
Observations:	**406**	**157**	**249**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

No overall or district specific differences were found between the intervention and comparison groups in relation to number of livestock lost due to disease.

TABLE 7.3.3.4:
Comparison of Intervention and Comparison Groups in Relation to Reported Loss of Livestock Due to Disease Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	10.39	10.86	10.11
Intervention mean:	10.91	10.41	11.30
Comparison mean:	9.97	11.34	9.33
Unadjusted difference :	0.940	-0.923	1.975
	(0.87)	(-0.50)	(1.51)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-1.783	-1.079	-2.343
(kernel)	(-0.96)	(-0.61)	(-0.79)
Observations:	**424**	**159**	**265**
Post-matching difference:	-0.236	-0.857	0.0978
(no replacement)	(-0.18)	(-0.47)	(0.05)
Observations:	**413**	**159**	**254**
Multivariable Regression:			
MVR coefficient (fe; robust):	-1.136	0.171	-1.659
	(-0.89)	(0.10)	(-0.85)
Observations:	**424**	**159**	**265**
MVR coefficient (rreg):	1.109	0.653	1.671
	(1.31)	(0.55)	(1.37)
Observations:	**423**	**159**	**265**
MVR coefficient (robust):	-0.803	0.219	-1.333
with control functions	(-0.90)	(0.12)	(-0.69)
Observations:	**415**	**157**	**258**

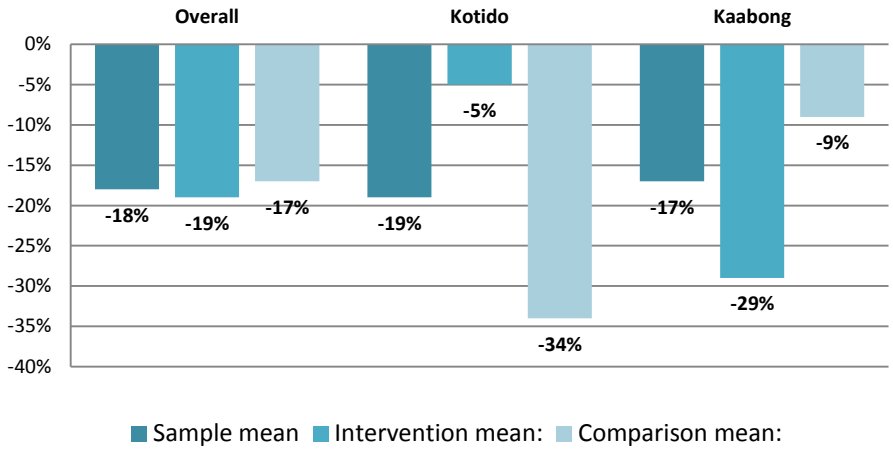
t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

- **Self Reported Change in Crop Production and Income from Sale of Crops and Livestock Products**

As explained above, the respondents were asked about the extent their production of crops and income earned through their sale, as well as the sale of livestock products, had changed since the baseline period. The unadjusted results are visually depicted in Figure 7.3.3.1. As is apparent, the respondents, overall, reported an average reduction in crop production of 18 percent. And there is little difference between the intervention and comparison groups. However, again, disaggregating the data by district reveals a different picture. The respondents from Kotido intervention group, for instance, reported only a five percent drop in production compared with 34 percent among members of the comparison group. The situation, however, is the reverse in Kaabong, with the women from the intervention group reporting greater loss than their comparators. Table 7.3.3.5 presents results of the statistical tests undertaken

on this variable. Two of the overall adjusted results are statistically significant and positive, as are all those associated with Kotido. While the unadjusted difference for Kaabong is statistically significant and in an undesirable direction, this statistical significance holds for only one of the adjusted estimates.

FIGURE 7.3.3.1:
Comparison of Intervention and Comparison Groups in Relation to Reported Changes in Crop Production Since Baseline - Unadjusted



The Kotido intervention group reported lower declines in crop production than their comparators.

TABLE 7.3.3.5:
Comparison of Intervention and Comparison Groups in Relation to Reported Changes in Crop Production Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-0.18	-0.19	-0.17
Intervention mean:	-0.19	-0.05	-0.29
Comparison mean:	-0.17	-0.34	-0.09
Unadjusted difference :	-0.0140	0.288***	-0.198***
	(-0.34)	(4.19)	(-4.25)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.113**	0.283***	-0.0404
(kernel)	(2.04)	(3.71)	(-0.49)
Observations:	**410**	**159**	**251**
Post-matching difference:	0.0701	0.294***	-0.143**
(no replacement)	(1.21)	(4.19)	(-2.25)
Observations:	**391**	**159**	**232**
Multivariable Regression:			
MVR coefficient (fe; robust):	0.0548	0.247***	-0.0761
	(0.40)	(3.47)	(-1.33)
Observations:	**410**	**159**	**251**
MVR coefficient (rreg):	0.0885*	0.218***	-0.0293
	(1.94)	(4.73)	(-0.46)
Observations:	**410**	**159**	**251**
MVR coefficient (robust):	0.0793	0.251***	-0.0871
with control functions	(0.48)	(3.50)	(-1.46)
Observations:	**404**	**157**	**247**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

The respondents were also asked about changes in their income from the sale of crops since the baseline period. The results of an analysis of their responses are presented in Table 7.3.3.6 below. The pattern is similar to the case of crop production. Overall, the respondents reported a decrease of about 19 percent in income earned from the sale of crops. However, again, the Kotido and Kaabong intervention groups reported less and more loss than their comparators, respectively. These results are statistically significant for most of the adjusted estimates. Table 7.3.3.7 follows with a similar analysis. However, this time the focus is on self-reported changes in income earned through the sale of livestock and livestock products. Again, there is a reported overall decrease, and the Kotido intervention group reported less of a loss, with the PSM estimates being statistically significant but not so for the regression estimates. While the unadjusted effect size is large and negative for the intervention group of Kaabong, the difference is no longer statistically significant across all the adjusted estimates.

Women of the Kotido and Kaabong intervention groups reported doing better and worse than their comparators in relation to farming profits, respectively.

TABLE 7.3.3.6:
Comparison of Intervention and Comparison Groups in Relation to Reported Changes in Income from Sale of Crops Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-0.19	-0.24	-0.16
Intervention mean:	-0.26	-0.15	-0.34
Comparison mean:	-0.14	-0.33	-0.04
Unadjusted difference :	-0.124***	0.178***	-0.299***
	(-2.93)	(2.83)	(-5.87)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0232	0.185***	-0.161**
(kernel)	(0.46)	(2.79)	(-2.21)
Observations:	**391**	**159**	**232**
Post-matching difference:	-0.0174	0.177***	-0.201***
(no replacement)	(-0.33)	(2.88)	(-2.82)
Observations:	**392**	**159**	**233**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.0234	0.130**	-0.142**
	(-0.22)	(2.08)	(-2.20)
Observations:	**391**	**159**	**232**
MVR coefficient (robust):	0.00441	0.113**	-0.103
with control functions	(0.09)	(2.05)	(-1.32)
Observations:	**391**	**159**	**232**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

Only the Kotido women reported doing better than their comparators in relation to livestock profits.

TABLE 7.3.3.7:
Comparison of Intervention and Comparison Groups in Relation to Reported Changes in Income from Sale of Livestock and Livestock Products Since Baseline

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	-0.22	-0.20	-0.23
Intervention mean:	-0.25	-0.13	-0.35
Comparison mean:	-0.19	-0.27	-0.15
Unadjusted difference :	-0.0668	0.138**	-0.201***
	(-1.46)	(2.42)	(-3.42)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	0.0464	0.151***	-0.0530
(kernel)	(1.02)	(2.67)	(-0.79)
Observations:	**407**	**159**	**248**
Post-matching difference:	0.0181	0.140**	-0.110
(no replacement)	(0.35)	(2.47)	(-1.41)
Observations:	**399**	**159**	**240**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.00305	0.0871	-0.0814
	(-0.04)	(1.53)	(-1.02)
Observations:	**407**	**159**	**248**
MVR coefficient (robust):	0.00424	0.0877	-0.0785
with control functions	(0.05)	(1.54)	(-0.95)
Observations:	**399**	**157**	**242**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

7.3.4 Measures of Women's Empowerment

As mentioned in Subsection 4.2, one of the outcome areas associated with the support provided to the targeted women groups of both Kotido and Kaabong districts is women's empowerment. If the support is truly working to empower women, one result that may be expected is their increased involvement in household decision-making. Recall that the instrument used to measure such involvement was described in Section 4.0. Table 7.3.4.1 presents the results of the statistical analysis of the data captured through its application. Overall, women scored fairly highly, with an average score of 65 percent of the total maximum score. There is a small difference between the intervention and comparison groups, but this difference was found no longer statistically significant following the statistical adjustment procedures. However, this is not the case when Kaabong district is examined in isolation. Four of the five adjusted estimates are statistically significant and unfortunately in an undesirable direction.

The women's household decision-making instrument is perhaps only appropriate for married women that live with their husbands. In other words, we assume that in female-headed households, the female head would likely be responsible for most, if not all, major decisions. However, this may not

necessarily be the case, particularly if there is an adult man or even older boy residing in the household. In any event, we felt it useful to also carry out the analysis for married women only. The results are presented in Table 7.3.4.2 below. As is apparent, the results are not considerably different from those of Table 7.3.4.1.

The intervention women of Kaabong reported being less involved in household decision-making than their comparators .

TABLE 7.3.4.1
Comparison of Intervention and Comparison Groups in Relation to Involvement in Household Decision-making (Percentage Score)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.65	0.62	0.68
Intervention mean:	0.64	0.62	0.65
Comparison mean:	0.65	0.62	0.68
Unadjusted difference :	-0.0220**	0.0183	-0.0363***
	(-2.00)	(0.93)	(-3.11)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-0.0106	0.00864	-0.0256
(kernel)	(-0.69)	(0.42)	(-1.11)
Observations:	**424**	**158**	**266**
Post-matching difference:	-0.0108	0.0180	-0.0361**
(no replacement)	(-0.82)	(0.95)	(-2.29)
Observations:	**400**	**159**	**241**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.0153	-0.00000650	-0.0420***
	(-0.78)	(-0.00)	(-2.64)
Observations:	**424**	**158**	**266**
MVR coefficient (rreg):	-0.0187**	-0.0214	-0.0248**
	(-2.03)	(-1.48)	(-2.00)
Observations:	**424**	**158**	**266**
MVR coefficient (robust):	-0.0241	0.00169	-0.0466***
with control functions	(-1.03)	(0.09)	(-2.77)
Observations:	**415**	**156**	**259**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

The respondents were also asked whether they independently own particular assets assumed important from a women's empowerment point of view, i.e. land, livestock, a house or other building, major farm and income generation assets, or any other valuable asset such as a bicycle. They were also asked whether they had any of their own savings. The results of the relevant statistical analysis are presented in Table 7.3.4.3. On average, the women reported owning just over one strategic asset, and no statistically significant difference was found between the intervention and comparison groups. However and again, there is a difference when the districts are examined separately. In Kotido district, women appear more likely to own more strategic assets. However, the difference is only significant for the PSM estimates, as the regressions estimates are not even significant with a 90 percent level of confidence.

A similar negative result was found when the analysis was focused on married women only.

TABLE 7.3.4.2
Comparison of Intervention and Comparison Groups in Relation to Involvement in Household Decision-making for Married Women Only (Percentage Score)

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	0.64	0.59	0.66
Intervention mean:	0.62	0.60	0.65
Comparison mean:	0.64	0.59	0.67
Unadjusted difference :	-0.0197*	0.00622	-0.0269**
	(-1.77)	(0.28)	(-2.56)
Observations:	**315**	**116**	**199**
PSM (ATT)			
Post-matching difference:	-0.0115	0.00583	-0.0240*
(kernel)	(-0.92)	(0.25)	(-1.69)
Observations:	**312**	**116**	**196**
Post-matching difference:	-0.0114	0.0127	-0.0241*
(no replacement)	(-0.92)	(0.59)	(-1.95)
Observations:	**303**	**116**	**187**
Multivariable Regression:			
MVR coefficient (fe; robust):	-0.0150	-0.0176	-0.0194
	(-1.23)	(-0.78)	(-1.36)
Observations:	**312**	**116**	**196**
MVR coefficient (rreg):	-0.0224**	-0.0278	-0.0309**
	(-2.24)	(-1.61)	(-2.44)
Observations:	**312**	**116**	**196**
MVR coefficient (robust):	-0.0160	-0.0168	-0.0223
with control functions	(-1.20)	(-0.74)	(-1.51)
Observations:	**304**	**114**	**190**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

No overall difference was found in relation to women's ownership of strategic assets, but two of the PSM estimation procedures revealed a positive difference for Kotido district.

TABLE 7.3.4.3
Comparison of Intervention and Comparison Groups in Relation to Number of "Strategic Assets" Owned

	Overall	Kotido	Kaabong
Unadjusted:			
Sample mean	1.15	1.18	1.13
Intervention mean:	1.23	1.41	1.09
Comparison mean:	1.08	0.94	1.15
Unadjusted difference :	0.150	0.480**	-0.0600
	(1.21)	(2.20)	(-0.42)
Observations:	**427**	**159**	**268**
PSM (ATT)			
Post-matching difference:	-0.0466	0.400*	-0.477
(kernel)	(-0.24)	(1.78)	(-1.58)
Observations:	**406**	**159**	**247**
Post-matching difference:	0.110	0.468**	-0.278
(no replacement)	(0.71)	(2.21)	(-1.28)
Observations:	**393**	**159**	**234**
Multivariable Regression:			
MVR coefficient (fe; robust):	0.0356	0.346	-0.169
	(0.13)	(1.57)	(-0.91)
Observations:	**406**	**159**	**247**
MVR coefficient (rreg):	0.117	0.280	0.0379
	(0.92)	(1.51)	(0.19)
Observations:	**406**	**159**	**247**
MVR coefficient (robust):	0.0632	0.328	-0.165
with control functions	(0.23)	(1.49)	(-0.85)
Observations:	**398**	**157**	**241**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01
PSM estimates bootstrapped 1000 repetitions

7.3.5 Examining the Effects of Better Exposure

As presented in Section 3.0, the OGB women's groups have been supported by multiple interventions. Moreover, as also presented in Section 4.0, the women and their households have been exposed to these interventions in differing degrees. It is of interest to use this variation to assess the effectiveness of these various interventions. To do this, interaction variables were created for those women in the intervention group who have been well exposed to the intervention or, where relevant, made use of the relevant "fruits," e.g. frequently stored their grain in the constructed storage facilities. These interaction variables were then incorporated into relevant multivariable regression models to assess if there are specific exposure effects. The relevant tables showing the results of these tests are presented in Annex 1. However, a narrative interpretation of the findings is presented below by intervention exposure type.

- *More frequent use of grain storage facilities*

Overall, those of the intervention group who reported storing their grain in the grain storage facilities were found to have higher household consumption and expenditure than the comparators. However, they also reported greater decreases in both crop production and agricultural profits. There appear to be different district level interaction effects as well. In Kotido, those who reported using the facilities more were not found to have higher levels of consumption and expenditure but are less food insecure. However, they also reported greater declines in agricultural profits and production. In Kaabong, those who reported using the facilities more frequently were found more likely to have higher consumption and expenditure but also more likely to be food insecure and report greater decreases in both agricultural production and profits.

More extensive use of the grain storage facilities does not appear to have increased agricultural profits but may have had some food security benefits for the Kotido frequent users.

Recall from Section 3.0 that one of the intended impacts of the grain storage facilities is increased agricultural profits. By having a safe place for the women to store their grain, they can hold onto it for longer and sell it when the price is higher. However, women in both districts who reported storing their grain with greater frequency in the OGB facilities were found more likely to report greater decreases in agricultural profits. These women do, nonetheless, appear to be more wealthy than those of intervention group that reported storing their grain less frequently, particularly in Kaabong district. But this may have nothing to do with the intervention: These women may have simply produced more grain than the other women and, therefore, desired to utilize the grain storage facilities with greater frequency.

One other primary outcome of the grain storage facilities is improved food security. Overall, women who reported using the facilities more were not more likely to indicate better food security. However, there is, again, a difference between the districts: In Kotido district, these women indicated better food security while those of Kaabong district indicated worse food security. It is therefore possible that the facilities are having a positive impact on food security for frequent users in Kotido district, while in Kaabong district those who are already more food insecure are using the facilities with greater frequency.

- *Greater receipt of agricultural inputs*

Overall, those in the intervention group who reported receiving agricultural inputs more than once reported less decreases in agricultural profits. However, there were no other overall interaction effects identified for the other outcome measures. In Kotido district, however, those who obtained more inputs were found to have greater consumption expenditure and more asset wealth and also reported doing better in relation to crop production. In Kaabong district, however, those who received more inputs reported greater food insecurity and a greater decline in crop production.

There may have been positive benefits for the women of Kotido district who were provided with agricultural inputs on more than one occasion.

- *Greater use of veterinary services*

Those who reported using animal husbandry services more were found, overall, to have higher consumption and expenditure, but also reported greater livestock loss. This trend was found to be similar in both districts. However, we cannot conclude that the higher consumption and expenditure and greater livestock loss is an effect of their greater use of the veterinary services. This is because those who make use of the services may be more likely to own more heads of livestock and therefore also more likely to be both more wealthy and experience greater livestock loss over time. The use of the randomised response model resulted in not having precise numbers of livestock owned for each respondent. As such, we could not control for baseline differences in livestock holdings in the statistical analysis.

- *Greater use of dams*

Those who reported using dams with greater frequency were found to have higher consumption and expenditure as well, with this also being the case for the household asset measure in Kaabong district. Again, however, obviously those that use dams more are likely to have more livestock and may also be more wealthy for reasons that have nothing to do with OGB support.

8.0 Conclusions and Learning Considerations

8.1 Conclusions

Overall, there is no evidence that indicates that the OGB support has brought about any substantive, positive change for the supported women.

Unfortunately and overall, no statistically significant differences were found between the interviewed women of the supported groups and their comparators on the various outcome measures used in the study. This reveals – overall – that the supported women are no better off in relation to these measures than would have been the case if they received the same types of support as the comparison women's groups. In other words, there is no evidence to indicate that the support OGB provided has been any more effective than the support accessed by the comparison women. This, by itself, is not such a great concern, given that both forms of support may be equally effective, and both the women of the intervention and comparison groups may actually be much better off than had they received no support at all. However, the intervention exposure data clearly reveal that a significantly higher percentage of the OGB supported women were exposed to the interventions in question and more intensely so. As such, if these interventions are truly effective, differences in the outcome measures between the intervention and comparison groups should have been identified.

There is some evidence, however, that the Kotido women have benefited in terms of improved food security and agricultural production and profits.

The picture is different, however, when the findings are disaggregated by district. Several of the outcome measures – i.e. the household food insecurity access scale and self-reported changes in crop production and agricultural profits, in particular – show that the intervention women in Kotido district were found to be better off than their comparators. While not all the effect estimates associated with the various estimation procedures are statistically significant, they likely would have been if a larger sample of women from Kotido were interviewed.

The situation is the reverse for Kaabong district, however. In particular, the women of the intervention group of this district were actually found to be worse off in relation to many of the outcome measures, including the global livelihoods outcome indicator. This is perplexing, given that a higher percentage of these women – vis-à-vis the women of the comparison groups – reported being significantly exposed to the OGB supported interventions as compared with their Kotido-based counterparts. Does it, therefore, follow that the support provided to the women of this district has had a negative impact, i.e. that the women would have been better off had they been supported in the same ways as their comparators? We are unable to reach this conclusion with any degree of confidence. This is because, as presented in Subsection 7.1, the intervention and comparison women of this district, in particular, are different in a number of important ways, e.g. the intervention women are, on average, older. While we were able to statistically control for these observable differences, it is quite possible that there are unmeasured differences that may explain why the intervention women of Kaabong district are worse off in relation to many of the outcome measures.

One may argue, therefore, that the OGB support provided to the women of Kaabong may actually have been effective but this is being overshadowed by certain unmeasured differences between themselves and their comparators. While this is certainly within the realm of possibility, the influences of these unmeasured differences would need to be quite substantive in order for such overshadowing to have taken place. A more plausible explanation is that the support provided to the women of Kaabong district has had little, if any, positive impact, at least in relation to the relevant outcome measures.

8.2 Programme Learning Considerations

As presented in Section 3.0, the Karamoja context is an exceptionally challenging one from a development facilitation point of view. As such, there are no obvious or simple solutions to the development challenges faced by the local population in general and the OGB supported women groups and their families in particular. The effectiveness review focused on assessing the impact of the support provided to the women's groups, primarily through quantitative means, rather than attempting to explore how to the support can be strengthened. There are several issues emerging from the analyses of the data and work undertaken that the Karamoja team can reflect on, which could strengthen their work. These include:

- **Assess whether Oxfam's advocacy strategy for Karamoja is sufficiently relevant**
  As the data clearly show, relatively recent historical events in the Karamoja sub-region have considerably degraded the livelihoods of the Karamojong

Strong, research-led policy work is critical, coupled with well researched and strategically focused interventions at the local level.

in general and the Jie and Dodoth clans that inhabit Kotido and Kaabong districts in particular. In many ways, an enabling environment for development to take place does not exist. Policies and actions taken by external stakeholders, including NGOs themselves, appear far from ideal. As such, the policy work being pursued by OGB is potentially of critical importance, and perhaps should even be intensified and strengthened. The overall Uganda and Karamoja team may want to consider whether it is worth investing resources and expertise in carrying out substantive qualitative research in the two districts and possibly other locations to identify more appropriate, but still workable, policies and actions that can be taken by the government and other actors. If the enabling environment is not improved, there is a risk that all future local level development gains made will simply be wiped out or overshadowed, regardless of the effectiveness of the interventions in question.

- **Review intervention implementation and uptake in both Kotido and Kaabong to identify why there are reported differences in impact between the two districts**
  As mentioned above, the supported women of Kaabong district reported being more intensively exposed to the OGB supported interventions but the women of Kotido district appear to have benefited more. What is the reason for this? Is it solely down to context, or are there differences in the way the interventions have been implemented in the two districts? If there are differences with regard to implementation, a short-term measure to improve the support is to harmonise the implementation between the two districts. If, on the other hand, it is related to contextual factors, action should be taken to adapt the nature of the support to take these into account.

- **Review the portfolio of support being provided to the women's groups and consider undertaking qualitative research to identify more focused support that is more likely to leverage substantive, sustainable change**
  As part of the review, we saw that OGB is attempting to implement a number of various interventions, and there is little evidence to suggest that these are effective. It may be better to concentrate effort and resources on a more limited number of interventions that will likely bring about significant change rather than many that may only bring about small changes. The Karamoja team may seek to engage in qualitative research to identify possible interventions that are appropriate for the local context but have a better chance of more substantively improving the lives of the supported women.

- **Explore the potential of investing more in agricultural production and commodity marketing**
  The data clearly reveal that agriculture has taken a significant turn for the worse for the women and their families of both the intervention and comparison groups. Crop yields and income earned from the sale of crops were reported as having declined considerably. However, while work is being undertaken to improve the policy environment, the findings of the effectiveness review revealed that crop cultivation does have potential to improve the livelihoods of the local population in general and the supported women and their families in particular. This was further

highlighted by the fact that, as presented in Subsection 7.3.5,the women of Kotido district who were supported with agricultural inputs on more than one occasion benefited to much greater extent than those who did not. However, rather than just providing the women's groups with inputs, a more strategic approach could be considered to increase both the production and marketing of crop products. This could be informed by an agri-business feasibility study that examines the comparative production advantage of the supported women and their families and market demand for the identified crops. The grain storage facilities could possibly also serve as collection points for potential buyers.

- **Explore Possibilities for Benefiting More People with Less Resources**
  While cost-effectiveness analysis was not undertaken, including costing of all the support provided to the women's groups, it is clear that a considerable amount of resources have been channelled to the supported women, yet they are just over 400 in number. Strategically narrowing in on specific interventions that are more likely to leverage big changes for larger numbers of people is something that the Karamoja team may want to take into consideration for the future.

ANNEX 1: Results of Interaction Tests For Those More Intensely Exposed to the Supported Interventions

Regression Output Showing the Interaction Effects on Those Who Frequently Use Grain Storage Facilities

	Consumption & expenditure	Household asset index	Food insecurity index	Reported change in crop prod.	Reported change in agri. profits
Overall:					
Original regression estimate	-0.0719	-0.123	-0.0241	0.0486	-0.0349
	(-0.94)	(-0.58)	(-0.12)	(1.09)	(-0.83)
Estimate controlling for those exposed	-0.172*	-0.298	-0.0792	0.213***	0.0806*
	(-1.92)	(-1.24)	(-0.33)	(4.12)	(1.65)
Interacted estimate for those better exposed	0.222**	0.353	0.113	-0.337***	-0.242***
	(2.47)	(1.38)	(0.42)	(-5.92)	(-4.50)
N	**422**	**422**	**422**	**422**	**422**
Kotido:					
Initial regression estimate	0.0848	0.651*	-0.644**	0.248***	0.131**
	(0.68)	(1.97)	(-2.23)	(3.49)	(2.09)
Estimate controlling for those exposed	0.0812	0.471	-0.197	0.352***	0.203***
	(0.59)	(1.28)	(-0.59)	(4.53)	(2.79)
Interacted estimate for those better exposed	0.0734	0.493	-1.264***	-0.313***	-0.219**
	(0.44)	(1.01)	(-2.67)	(-2.81)	(-2.36)
N	**156**	**156**	**156**	**156**	**156**
Kaabong:					
Initial regression estimate	-0.236**	-0.689**	0.0203	-0.0914	-0.156**
	(-2.19)	(-2.47)	(0.08)	(-1.60)	(-2.54)
Estimate controlling for those exposed	-0.362***	-0.828***	-0.490*	0.0536	-0.0517
	(-2.94)	(-2.95)	(-1.66)	(0.77)	(-0.74)
Interacted estimate for those better exposed	0.230**	0.249	0.903***	-0.257***	-0.187***
	(2.02)	(0.97)	(3.13)	(-3.89)	(-2.66)
N	**266**	**266**	**266**	**266**	**266**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Regression Output Showing the Interaction Effects on Those Who Frequently Received Inputs >1 Time

	Consumption & expenditure	Household asset index	Food insecurity index	Reported change in crop prod.	Reported change in agri. profits
Overall:					
Initial regression estimate	-0.0719	-0.123	-0.0241	0.0486	-0.0349
	(-0.94)	(-0.58)	(-0.12)	(1.09)	(-0.83)
Estimate controlling for those exposed	-0.0985	-0.158	-0.230	0.0156	-0.118**
	(-1.07)	(-0.67)	(-0.96)	(0.29)	(-2.36)
Interacted estimate for those better exposed	0.0523	0.0689	0.404	0.0648	0.163***
	(0.58)	(0.29)	(1.57)	(1.12)	(3.05)
N	**427**	**427**	**427**	**427**	**427**
Kotido:					
Initial regression estimate	0.0848	0.651*	-0.644**	0.248***	0.131**
	(0.68)	(1.97)	(-2.23)	(3.49)	(2.09)
Estimate controlling for those exposed	-0.0581	0.101	-0.531	0.0587	-0.0179
	(-0.42)	(0.26)	(-1.47)	(0.68)	(-0.24)
Interacted estimate for those better exposed	0.323*	1.244***	-0.256	0.429***	0.337***
	(1.89)	(2.95)	(-0.51)	(4.21)	(3.63)
N	**159**	**159**	**159**	**159**	**159**
Kaabong:					
Initial regression estimate	-0.236**	-0.689**	0.0203	-0.0914	-0.156**
	(-2.19)	(-2.47)	(0.08)	(-1.60)	(-2.54)
Estimate controlling for those exposed	-0.201	-0.683**	-0.250	-0.0368	-0.177**
	(-1.60)	(-2.29)	(-0.85)	(-0.54)	(-2.46)
Interacted estimate for those	-0.0654	-0.0124	0.507*	-0.102*	0.0402
	(-0.62)	(-0.05)	(1.80)	(-1.73)	(0.60)
N	**268**	**268**	**268**	**268**	**268**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

ANNEX 1: Results of Interaction Tests For Those More Intensely Exposed to the Supported Interventions

Regression Output Showing the Interaction Effects on Those Who Frequently Use Vet. Services

	Consumption & expenditure	Household asset index	Food insecurity Index	Reported livestock loss
Overall:				
Initial regression estimate	-0.0719	-0.123	-0.0241	-1.120
	(-0.94)	(-0.58)	(-0.12)	(-0.90)
Estimate controlling for those exposed	-0.191**	-0.171	0.101	-3.658***
	(-2.15)	(-0.71)	(0.41)	(-2.88)
Interacted estimate for those better exposed	0.252***	0.114	-0.233	5.282***
	(2.60)	(0.41)	(-0.81)	(3.33)
N	**426**	**426**	**426**	**426**
Kotido:				
Initial regression estimate	0.0848	0.651*	-0.644**	0.237
	(0.68)	(1.97)	(-2.23)	(0.13)
Estimate controlling for those exposed	-0.0657	0.451	-0.522	-1.053
	(-0.48)	(1.27)	(-1.63)	(-0.58)
Interacted estimate for those better exposed	0.472***	0.615	-0.302	3.695
	(3.17)	(1.15)	(-0.55)	(1.41)
N	**158**	**158**	**158**	**158**
Kaabong:				
Initial regression estimate	-0.236**	-0.689**	0.0203	-1.639
	(-2.19)	(-2.47)	(0.08)	(-0.84)
Estimate controlling for those exposed	-0.372***	-0.917***	0.248	-5.562***
	(-2.94)	(-2.72)	(0.75)	(-2.76)
Interacted estimate for those Better exposed	0.208*	0.347	-0.347	5.978***
	(1.72)	(1.26)	(-1.11)	(3.27)
N	**268**	**268**	**268**	**268**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Regression Output Showing the Interaction Effects on Those Who Frequently Use Dams

	Consumption & expenditure	Household asset index	Food insecurity Index	Reported livestock loss
Overall:				
Initial regression estimate	-0.0719	-0.123	-0.0241	-1.120
	(-0.94)	(-0.58)	(-0.12)	(-0.90)
Estimate controlling for those exposed	-0.0929	-0.159	0.00350	-1.035
	(-1.24)	(-0.73)	(0.02)	(-0.84)
Interacted estimate for those better exposed	0.233***	0.155	-0.189	0.650
	(3.46)	(0.67)	(-0.98)	(0.52)
N	**426**	**426**	**426**	**426**
Kotido:				
Initial regression estimate	0.0848	0.651*	-0.644**	0.237
	(0.68)	(1.97)	(-2.23)	(0.13)
Estimate controlling for those exposed	0.0807	0.629*	-0.563*	0.708
	(0.65)	(1.84)	(-1.97)	(0.41)
Interacted estimate for those better exposed	0.229*	-0.156	-0.995***	-0.325
	(1.71)	(-0.40)	(-2.94)	(-0.17)
N	**158**	**158**	**158**	**158**
Kaabong:				
Initial regression estimate	-0.236**	-0.689**	0.0203	-1.639
	(-2.19)	(-2.47)	(0.08)	(-0.84)
Estimate controlling for those exposed	-0.282***	-0.782***	-0.0452	-1.831
	(-2.68)	(-2.70)	(-0.18)	(-0.96)
Interacted estimate for those Better exposed	0.250***	0.509*	0.359	1.054
	(2.95)	(1.93)	(1.65)	(0.69)
N	**268**	**268**	**268**	**268**

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01