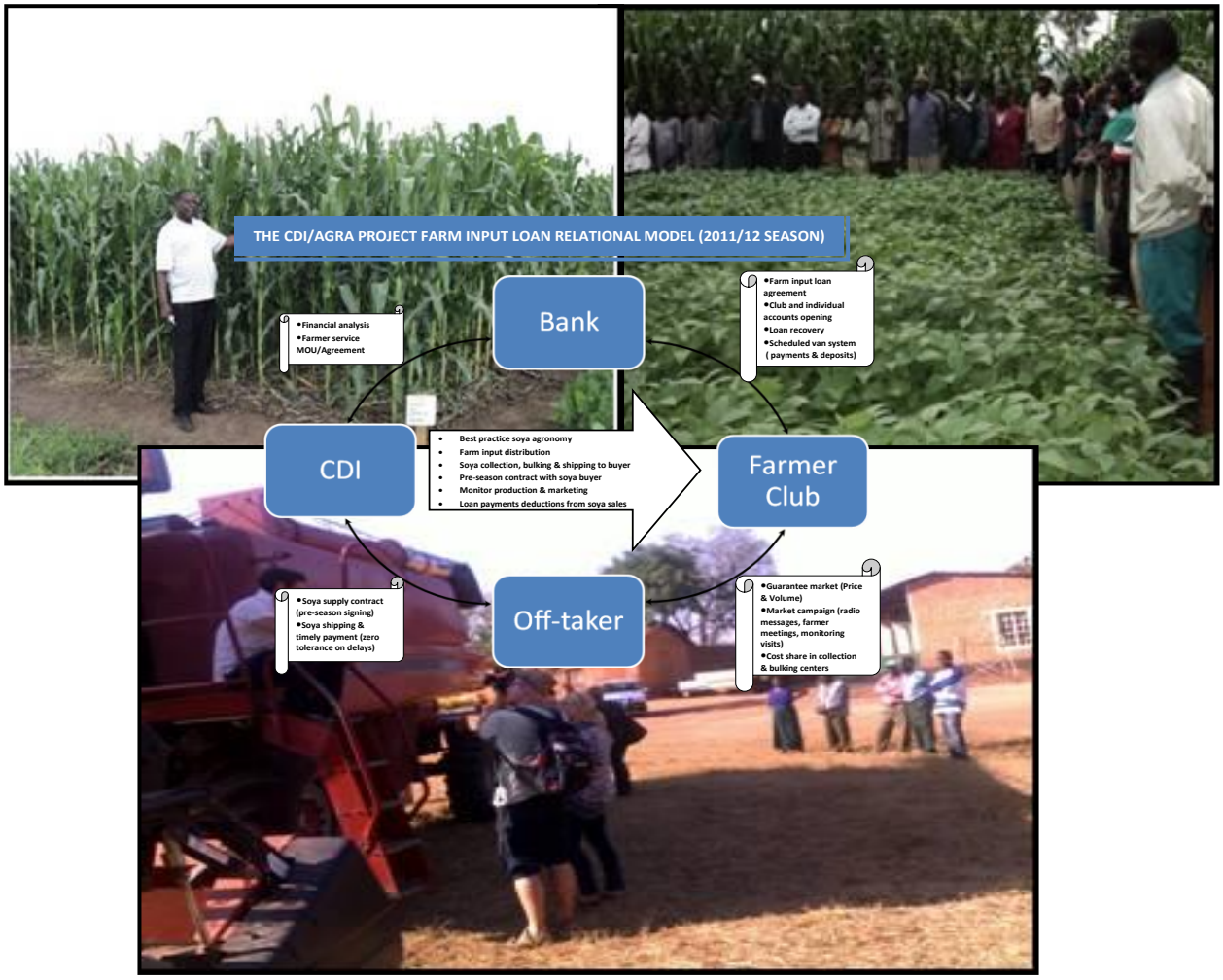
Africa Centre for Social Research and Economic Development (ACSRED)

RAPID ASSESSMENT OF A PROJECT:

Increasing smallholder soybean and maize productivity through integrated soil fertility management and better access to markets in Malawi



SUBMITTED TO

The Alliance for Green Revolution in Africa (AGRA)

Nairobi, KENYA

By

AFRICAN CENTRE FOR SOCIAL RESEARCH AND ECONOMIC DEVELOPMENT

Malawi Office

P.O. BOX 31343
LILONGWE, Malawi
Email: acsred2013@yahoo.com

July, 2014

Acronyms and Abbreviations

AGRA	Alliance for a Green Revolution in Africa
ISFM	Integrated Soil Fertility Management
NGO	Non-Governmental Organisation
PI	Principal Investigator
PIP	Project Implementation Plan
PM & E	Project Monitoring and Evaluation
SHP	Soil Health Program
ToR	Terms of Reference

Table of Contents

List of Tables

List of Figures

ACKNOWLEDGEMENTS

We would like to thank all those who, in one way or another, contributed to the execution of the Rapid assessment exercise of the AGRA- funded project on 'Increasing smallholder soybean and maize productivity through integrated soil fertility management and better access to markets in Malawi' consequently leading to the creation of this important report. AGRA management and the staff of the Soil Health Program and the M&E Unit are saluted for giving ACSRED an opportunity to work with AGRA on this assignment. In particular Mr. Emmanuel Rutsimba and Ms. Josephine Njau are saluted for the commendable job in providing advice and logistical support in the execution of the study. We also thank Mr. Austin Ngwira of Clinton Hunters in Malawi, who is also Director and manager for the project, the project staff, and the entire team of enumerators for their part in the execution of this Rapid assessment. Finally, we would like to thank all those we interviewed for giving us their time and the data we needed. All errors and shortcomings remain ours.

ACSRED
Lilongwe, Malawi

EXECUTIVE SUMMARY

Background

The project sought to reach 30,000 smallholder farmers and increase crop productivity of soybean and maize from average 1,200kg/ha and 2,600kg to 2,000kg/ha and 4,000kg/ha respectively in Mchinji District. The specific objectives of the project included: increasing access to improved soybean seeds through multiplication on the anchor farm and at Chitedze Research Station, as well as procurement from seed companies; improving the agronomy of maize-soybean rotation systems; and develop appropriate fertilizer recommendations for soybean-maize rotations, building on earlier work in Malawi on 'best-bet' practices for legumes that was supported by the Rockefeller Foundation; improving extension services through the combined use of Government extension workers and lead farmers that would be empowered; developing structured access to markets through strong links with food and feed industry using the anchor farm as the conduit; enhancing the processing and utilization of soybeans; and finally, building strong and effective farmer organizations affiliated to the National Association of Smallholder Farmers of Malawi (NASFAM). This was to be achieved through working in all the six Government extension planning areas (EPAs) of Mchinji District where the anchor farm business model has been initiated. In terms of outreach, the findings revealed that the project scaled up the coverage of smallholder farmers from 126 farmers in 2009 to 25,384 in 2013 suggesting an achievement rate of 70% of the project outreach goal.

Methodology

The study was conducted in Mchinji District where the project is currently being implemented. A sample size of 330 households was drawn from Extension Planning Areas (EPAs) of Mlonyeni, Kalulu, Mkanda, Msitu, Mikundi, and Chiosya. The study used a number of data collection tools including household questionnaire, stakeholder consultations and key informant interviews, literature review of relevant project documents, Focus Group Discussions, field observations, and case studies. The data was analyzed and presented in the form of tables and figures, and properly interpreted.

Main Findings

Project relevance. The review was satisfied that the project goal, objectives and strategies are well stated and clear to staff and other stakeholders. The project is relevant to the needs of the

smallholder farmers in Malawi, and it is addressing the relevant problems along the agricultural value chain.

Project Performance

Objective 1: increasing access to improved soybeans seeds through multiplication on the anchor farm and at Chitedze Research Station as well as procurement from seed companies. The project aimed at raising the number of farmers having access to improved seed from nearly 0% to 100% of the beneficiaries. Results of the study indicate that about 8% of the farmers had access to hybrid maize and soybean varieties. The results also indicated that project participants had better access to improved seeds than did non-participants. Access to improved seeds was mainly through agricultural loans. However, it was noted that there was low level of seed multiplication at the anchor farm hence most farmers accessed their seed from agro-dealers other than the farmers' hub. While this is indicative of the limitations of the anchor farms to produce enough seed for the participating farmers, it was noted that there is an overwhelming demand by both projrct anf non-project farmers for the seed produced by the anchor farm. As such it was recommended that the capacity for seed multiplication at anchor farms need to be strengthened.

Objective 2: Improving the agronomy of maize-soybean rotation systems and develop appropriate fertilizer recommendations for soybean-maize rotations, building on earlier work in Malawi on 'best-bet' practices for legumes that was supported by the Rockefeller Foundation

The major anticipated outputs under this objective included the expansion of the number of farmers receiving agronomic instructions for soybean from 168 to 30,000 by 2012, and increased soybean and maize yields from average 1,200kg/ha and 2,600kg to 2,000kg/ha and 4,000kg/ha, respectively. The project developed fertilizer recommendations for soya based on field tests from 41 soya fields under Mpherero, Kaundula and Farm 68 anchor farms. However, farmers did not access these because of delays in releasing recommendations due to problems encountered in working with partner institutions. The study also found out that the project managed to reach 25,384 farmers with information on general agronomic instructions representing 73% achievement towards this objective. In addition, study results indicated that mean yield productivity for maize was 1.7tons/ha and 0.98tons/ha for soybeans. However, project documents indicated that productivity reached 2tons/ha for soybeans and 5.5tons/ha for maize in 2013 based on yields at demonstration plots. It has to be noted that productivity estimates

reported in project reports was based on yields at demonstration plot yields which did not incorporate farmer garden yields. It should however be cautioned that farmers' estimates may be affected by under-reporting due to measurement errors on area and NBS farm input default (afraid that if they report high, they would be pressurized to repay NBS loans).

Objective 3: improving extension services through the combined use of Government extension workers and lead farmers that would be empowered. The major expected outputs under this objective was to increase the number of agricultural extension workers from 3 to 28, lead farmers from 11 to 525 and famers from 600 to 30,000 by the end of 2013. This objective was largely achieved as it registered 158 extension workers, 1,933 lead farmers and 25,384 smallholder farmers by the end of 2013.

Objective 4: Developing structured access to markets through strong links with food and feed industry using the anchor farm as the conduit. The main aim under this objective was to secure competitive and reliable markets for smallholder soybeans and maize farmers. The expected output was improved market access by farmers and the second indicator was the volume and value of soybean and maize sold to preferred buyers. A third output indicator was the number of farmers with regular access to soybean and maize market information. By the end of 2013, the project secured 11 supply contracts with sellers and buyers. By the same year, 9,450 tons of hybrid soybeans and 15, 750 tons of hybrid maize was sold under the project against baseline values of 30t for soybeans and 0t for maize. The contract base prices were $500/ton for soybean and $100/t for maize. With such good prices for soybean, it can be concluded that the project achieved its objective of increasing soybean farm gate prices, while maize prices remained low. However, most farmers defaulted their contracts because of low prices as most companies prefer buying when the prices are low. To this effect, CDI has now decided to introduce the warehouse receipts system to enable farmers deposit their farm produce in a warehouse operated by CDI and wait for the right prices.

The project was also meant to assist smallholders in accessing bank loan and bank accounts. This involved making presentations for soya profit and loss accounts to key financial institutions for buy-in and submitting farm input loan requirements for 4,000 farmers. The negotiation process with financial institutions on the lending model was done to convince lenders on the viability of soy bean lending. This led to significant achievements with regards to linking farmers to financial markets. By December 2013, 3216 farmers had been linked to NBS bank where they

accessed loans for agricultural inputs valued at a total of MK109 million. However, loan repayments were only 60%. The low repayment rate was partially attributed to a reduction in the national prices of soya beans.

Objective 5: enhancing the processing and utilization of soybeans. The major output under this objective was training about 75% of the farmers on in-house preparation of soybean based meals. By the year 2013, about 25, 384 farmers were trained on processing and utilization of soybeans through training workshops facilitated by the project staff, representing 73% of the farmers. However, when asked on the specific soybean based recipes, only a small percentage (52.4%, for chikondamoyo, 26.2% for soybean milk and 4.5% for sweet potato-soybean futali) eported having been trained on these recipes. Furthermore, consumption of soybean based meals was also observed to be low among respondent households calling for more farmer training. It was recommended that there is need for more demonstration on soybean processing and utilization so that more farmers adopt the technology, and that specific nutrition assessment indicators be included in the project to effectively measure this objective.

Objective 6: Building strong and effective farmer organizations affiliated to the National Association of Smallholder Farmers of Malawi (NASFAM). The main output under this objective was the number of strong farmer organizations affiliated to NASFAM. The goal was to train about 28 extension workers and 525 lead farmers on famer organization by the third year of the project. By the third year these figures were surpassed by 171% and 157% respectively. The planned number of clubs formed was 1400, and 1348 (96%) were formed. Lastly, the planned number of clubs with capacity development plans was surpassed by 28% (1, 050 planned against 1348 achieved). All in all, the performance of the objective with respect to its indicators has been remarkable. It was however, observed that there is still lack of reliable markets for members' commodities and products. In addition, members of Farmers' organizations still need sensitizations to elicit their commitment towards the activities and goals of their clubs.

Sustainability

The fieldwork has shown that the anchor farm model has great potential for sustainability. The project is unique in that it links farmers directly to input and output markets through the anchor farm. This arrangement allows farmers to benefit more in terms of getting better prices for their produce (outputs) as well as inputs. This is an incentive to participate in the project other than working as individual farmers. The anchor farm is a commercialization approach to agriculture

which will build more sustainability in the project. Project staff pointed out that there is a lot of demand for Soybeans in the country presently in oil processing firms. This means farmers have a ready market for the soybeans they grow which is the best thing about this project.
Secondly, the project has a large number of lead farmers and Extension workers including farmers themselves who have been trained in ISFM practices. This implies that farmers will be able in the long run to harvest most outputs with little spent on purchasing inputs like fertilizers. This means more resources will be left for investments in other areas of farming.

For nutritional benefits, the project is still striving to train more farmers in preparation of soybean based recipes which will generate more incomes for participating farmers and improve their nutrition. This is an incentive to participate in the project.
Furthermore, the fact that the project is benefiting from the current funding from Clinton Development Initiative (CDI) which will continue even after the AGRA funding ends is another sustainability mechanism. Thus, some project activities established are likely to be implemented even after the project comes to an end. Furthermore, the field work revealed that the project built capacity at several levels starting with Researchers in Chitedze research Station, Extension workers as well lead farmers and farmers in general. The skills attained are likely to be used beyond the project life.

In general, sustainability of the project is anchored on four pillars. The first being identification of markets for farm produce which the project has strived and is still striving to do; second, linking farmers to agricultural credit which the project has achieved; third is access to improved seeds which the project has achieved by a considerable margin, and fourth is good agricultural production techniques including integration of ISFM. All these components of the project are positive suggesting that the project has greater capacity for sustainability. Moreover, sustainability of the model will depend the capacity buit by the project of both Government extension agents and lead farmers through knowledge and skills training and the farmer groups formed by the project around the farm such as collective marketing groups will be facilitated to participate in the agricultural value chains through for example, keeping community seed banks, having access to warehousing facilities to store their produce, being able to purchase inputs collectively, getting linked to financial institutions through joint liability mechanisms, etc. Thus the farmer groups formed by the project are important institutions that will anchor the sustainability for the model, more especially if the private sector (agro dealers and financial institutions) find it profitable to trade with them and if government policy facilitates enforcement of contracts between buyers

and sellers to reduce side selling and reneging of contractual obligations. Also for sustainability, farmer groups will have to take more roles of collecting market information or conducting market intelligence activities after the project support ends in order for them to continue getting up to date commodity price information.

General challenges and constraints to accomplishing the expected results

There were a number of challenges that hampered accomplishment of expected results of the project. However, these cannot outweigh the accomplishments that the project has registered so far. These include challenges in obtaining site-specific fertilizer recommendations due to delays in having them released because of problems encountered in working with partner institutions, challenges with macroeconomic instability, challenges in working with financial institutions because of the associated risk of agricultural lending, and erratic rainfall patterns as there is no irrigation technology being practiced on the project cite.

General Recommendations

There is need to strengthen the role of seed multiplication through the anchor farm so that farmers access seed at any time they need it. CDI should develop its own soybean seed business other than relying on other sources of seed. There is also need to improve promptness in repayment of loans by farmers so that more famers are able to access loans for commercial production and graduate from subsistence farming. Furthermore, there is need to emphasize training of farmers to improve knowledge and enhance adoption of improved varieties. Capacity Building of the members of farmers' organizations in the area of FO development should be continued. The project should ensure that only certified high quality seed from credible sources is distributed to the farmers as this will improve crop productivity. Farmers should be encouraged to identify their own markets through their groups, rather than waiting for CDI to identify markets for them. The warehouse receipt system has to be promoted and strengthened. Finally, delivery of seed materials and other inputs as well as information on Integrated Soil Fertility Management (ISFM) techniques should be done timely to ensure that farmers' field operations are not negatively affected.

Table 1 Achievements against Targets

Objective 1 : increasing access to improved soybeans seeds through multiplication on the anchor farm and at Chitedze Research Station as well as procurement from seed companies;		
Type of Information/outputs	**Targeted outputs by end of project**	**Actual output**
Soil sampling and testing (number of samples per day)	2,625 samples in one month (August of year 3)	137 soil sample in total
Lab results reporting (Turnaround time)	525 soil test kits for each of the 525 farmer groups year 3	NA
Site-specific fertilizer formulations	2,625 samples in one month (Aug. of year 3) 525 fertilizer guides for 525 sites in year	Recommendations for 3 farms (Mpherero, Kandaula & farm 68. 41 field in total
Certified hybrid maize seed production inspection (Number of visits to contract growers)	Weekly between Feb and Jul each year	Twice every month
Certified improved soybean seed production inspection (Number of visits to contract growers)	At least 5 visits per year	Twice every month
On-farm demonstrations (agronomy)	525 demo plots in year 3	NA
On-farm demonstrations (soybean processing and utilization)	525 demo plots in year 3	NA
Amount of soybeans seeds produced on the anchor farm	NA	301.5 tons by 2013
Amount of soybean seed accessed through loans	NA	86,047.9kg by 2011
Access to improved soybean and maize seeds	100% of the farmers	80% of the farmers
Percentage of farmers planting improved soybean and maize seeds	100%	84% of the farmers
Number of farmers growing improved soybean seeds	25, 384 by yr. 3	3,910 farmers
Objective 2 : improving the agronomy of maize-soybean rotation systems and develop appropriate fertilizer recommendations for soybean-maize rotations, building on earlier work in Malawi on 'best-bet' practices for legumes that was supported by the Rockefeller Foundation;		
Type of Information/outputs	**Targeted outputs by end of project**	
Extension workers trained on integrated soil management practices	525 Lead farmers , 28 Extension workers in trained,	1933 lead farmers and 158 extension workers
Farmers trained on integrated soil management practices	30,000 farmers in year 3	25, 384 farmers
Farmers making contour ridge alignment for soil and water conservation	15,750 farmers in year 3	10% of the farmers
Farmers applying organic manure	15,750 farmers in year 3	10,021 farmers by yr 3
Farmers applying site specific inorganic fertilizer formulations to soybean and/or maize crops	15,750 farmers in year 3	NA
Farmers growing fertilizer tree	15750 farmers in year 3	14,164 farmers in yr. 3
Farmers practice cereal-legume crop rotation (%)	75% of 30,000 farmers in year 3	70 % of farmers

Yields of improved soybean (kg/ha)	2 tons/ha	0.98 tons/ha
Yields of improved maize	4 tons/ha	1.6 tons/ha
Objective 3: improving extension services through the combined use of Government extension workers and lead farmers that would be empowered,		
Number of lead farmers and extension workers trained in best bet soybeans-maize rotation ISFM practices (including conservation agriculture with agroforestry technologies)	525 L/Farmers At least 30% are women28 extension workers trained on ISFM	1933 lead farmers and 158 extension workers
Farmers trained in soybean-maize agronomy and integrated soil management best practices (including conservation agriculture with agroforestry technologies)	600 farmers in Yr. 1; and 30,000 in Yr. 3.At least 30% are women	25, 384 farmers in year 3
Yield of improved rotation maize crop (kg/ha)	8,400ha planted to soybean in year 1;	NA
Improved soybean seed distribution to farmers (tons) Improved access to maize seeds (tons)	At least 30% of farmers using improved seeds must be women	45% women
Soil fertility status	Significant improvements in organic matter and soil fertility status by Yr. 3	NA
Objective 4 : developing structured access to markets through strong links with food and feed industry using the anchor farm as the conduit,		
Type of Information	**Targeted outputs by end of project**	
Farm gate prices within 10% of processor FOB price or import parity;	Contract with buyers by the end of Yr. 1 Available and updated monthly	11 contracts by year 3
Volume of soybean and maize sold to preferred buyers;	9,450 tons of soybean sold in Yr. 3	660 tons of soybeans and 415 tons of maize by 2012
Value of soybean and maize sales to preferred buyers (US$)	15,750 tons of maize sold in Yr. 3	US$370347.2
Farmers access to regular soybean and maize market information (number)	30,000 farmers accessing market information	NA
Objective 5 : enhancing the processing and utilization of soybeans,		
Extension workers trained on soybean based recipes for human food and livestock feed	525 lead farmers 28 Extension workers	1348 lead farmers and 76 extension workers
No. of farmers trained in preparation of soybean based meals	30,000 farmers	25, 384 farmers
Percentage of farmers utilizing chikondamoyo, soybean milk and sweet potato-soybean futali	NA	76%, 20%, 2.9% respectively
Objective 6: Building strong and effective farmer organizations affiliated to the National Association of Smallholder Farmers of Malawi (NASFAM).		
No. of lead farmers and extension workers trained in farmer organizations	525 Lead farmers, 28 Extension workers	1933 lead farmers and 158 extension workers
No. farmer clubs formed	2035	1915
No. of clubs with a capacity building plan	1685	1915

1 OVERVIEW

1.1 Introduction

The Alliance for Green Revolution in Africa (AGRA) contracted the African Centre for Social Research and Economic Development (ACSRED) to conduct a Rapid Assessment of the project (*Increasing smallholder soybean and maize productivity through integrated soil fertility management and better access to markets in Malawi*). The project has been implemented by the Clinton Development Initiative in Malawi (CDI) since March 2010. The principal objective of the project is to reach 30,000 smallholder farmers of soybean and maize by 2012 and increase their productivity to 2,000 kg/ha for soybean and 4,000 kg/ha for maize. The project is implemented through six (6) interventions that are essential for realizing soil fertility, incomes and nutritional benefits of soybeans.

This Report contains results of the Rapid Assessment which was conducted by a team of independent consultants. The report is structured as follows: The background of the study, Terms of Reference, objectives, and the methodology are presented in section one. Section two presents the results while the challenges and recommendations are presented in sections three and four, respectively.

1.2 Project Background

In Malawi, agriculture remains an important component of the economy employing 85 percent of the labor force, and accounting for about 39 percent of the Gross Domestic Product (GDP) and 83 percent of Malawi's foreign exchange earnings (Chirwa, 2007). The agricultural sector is subdivided into sub-sectors; estates and smallholder sectors. The later accounts for 78 percent of the cultivated land and generates about 75 percent of Malawi's total agricultural output, suggesting that Malawi's agriculture is largely smallholder agriculture. More than 72 percent of the smallholder farms are less than one hectare, a size too small to achieve food self-sufficiency at the household level with the current rudimentary farming methods.

A significant feature in Malawi's agriculture is the dominance of maize in the farming systems. It is estimated that about 70 percent of the arable land is allocated to maize production (Government of Malawi, 2004). Pulses which include several types of beans including soybeans, pigeon pea, chickpea, Bambara nuts etc., account for less than 20 percent of the cultivated land. Yields for both maize and soybeans remain low. The national average yields of soybeans range from 0.4 to 1.0 ton

per hectare (Government of Malawi, 2008). In Mchinji District, one of the intervention Districts, the average soybean yields in the 2008/09 growing season were estimated at 1.2 tons per hectare (Malawi Government, 2009). Yet the current soybean varieties that SeedCo. Ltd supplies in Malawi (Solitaire, Sirocco, Soprano) have an attainable yield level of up to 4.5 tons per hectare with good management (Government of Malawi, 2008).

Similarly, average maize yields were 3.44 tons per hectare in 2006/07 season, and up from 2.58 tons per hectare in 2005/06, largely attributed to the ambitious and successful Government farm input subsidy program (Denning et al., 2009). In Mchinji District, maize production yield was estimated at 2.3 tons per hectare in 2007/08 season and 2.6 tons per hectare in 2008/09 season (Mchinji District Agriculture Office, 2009). Yet, for most of the improved maize varieties that seed companies distribute, attainable yields by smallholder farmers are in the range of 4.0 to 5.0 tons per hectare under good management.

Against this background, this project was launched by the Clinton Development Initiative Program in Malawi (CDI), with financial support from AGRA to increase smallholder soybean and maize productivity through integrated soil fertility management and better access to markets in Malawi. The project sought to reach 30,000 smallholder farmers and increase crop productivity to 2,000 kg/ha for soybean and 4,000 kg/ha for maize in Mchinji District.

The project is being implemented in collaboration with a number of partners, which include Chitedze Agricultural Research Station, ICRAF, Total Land Care, NASFAM, Department of Agricultural Extension Services, farm input suppliers [seed, fertilizer, chemicals], financial service providers, and Bunda College.

1.2.1 The Project Objectives

The project interventions envisaged six objectives aimed at realizing soil fertility, incomes and nutritional benefits of soybeans and maize. The objectives, outputs and outcomes of the project are outlined in Annex 2 (See section 7.2 and 7.3).

1.3 Study Terms of Reference

The general objective of the study was to conduct an Independent Rapid Assessment of the AGRA funded project using available reports and primary data collected through key informant interviews and a household survey. The Rapid Assessment had eight objectives (See Appendix 7.8).

1.4 Evaluation Methodology

1.4.1 Study site, Methods and sources of data

All households that benefited from this project were sampled from Mchinji District. A combination of both quantitative and qualitative methods in order to fully address the evaluation objectives and key questions raised was used. The two methods were chosen to ensure that there was triangulation and verification of the results, which in turn improved the robustness of the findings. The two methods complemented each other in cases where quantitative data was inadequate or questionable. A combination of sources of data, including literature review/desk research, focus group discussions and key informant interviews was also used.

The team utilized methodological framework that seeks to empower stakeholders especially project staff and beneficiaries with new skills and knowledge, but also leads to effective utilization of the information generated. As such, assessment was guided by the impact pathway presented in Fig 1 which outlines the impact pathway and how the AGRA supported project interventions contribute to access to improved soybean technologies, new knowledge and action (e.g. adoption), reliable markets by farmers which in turn delivers the intended impacts of the project. The figure also presents how crop and market related inputs and activities are expected to lead to the desired outputs and outcomes such as improved crop yields, increased participation in marketing by farmers, improved incomes for rural households, and improved food security.

The project implementation is based on the CDI anchor farm business development model. The Anchor Farm Project is a CDI-operated commercial farm that partners with thousands of neighboring smallholder farmers, providing them with access to quality inputs for maize and soybean production as well as training and market access. Farmers in the project have access to improved soybean seed and to training in advanced agronomic techniques, and they have direct access to a domestic bulk buyers of their soybeans. The farm model helps individual farmers navigate the markets by identifying commodities that have established markets with growth potential. CDI facilitates this process by organizing large groups of local farmers to run a commercial farm to produce crops that can enter the identified markets. CDI is expected to provide smallholder farmers with access to improved soybean seed, training and monitoring of advanced agronomic techniques, and access to a domestic, bulk buyers of soybeans. CDI is also working with banks in Malawi to provide smallholder farmers with loans to finance their input purchases and banking accounts to help them save money after the sale of their crops, and is working to expand

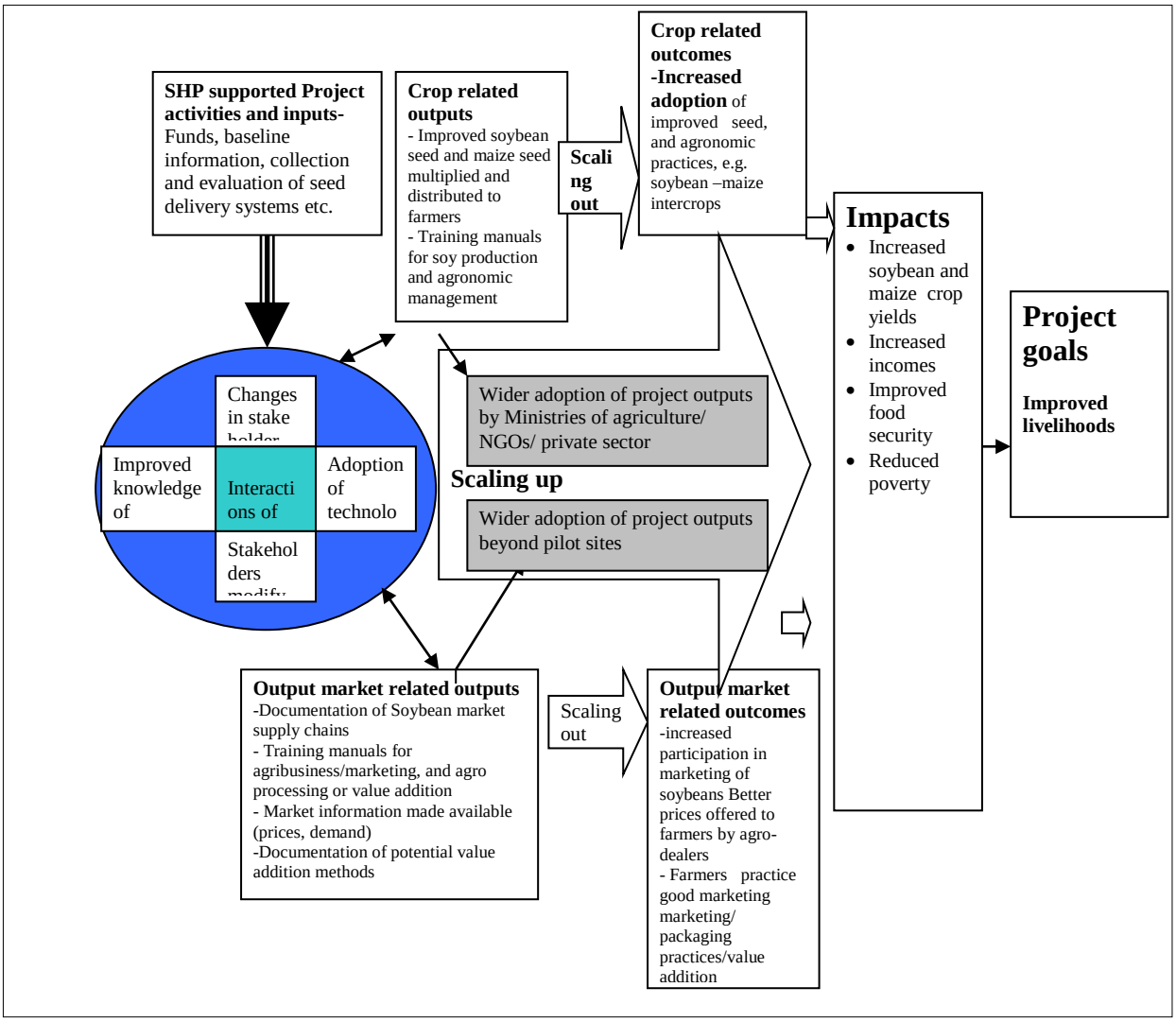


Figure 1: The Impact Assessment Pathway for the SHP/CDI Soybean bean/Maize improvement Project

the Anchor Farm Project to Tanzania. By appraising the project, the anchor farm business development model was also appraised. This appraisal also assessed the extent to which farmers participating in the project are able to access markets and at better prices than non-project participants. An interesting dimension of the assessment also looked at the extent of sustainability of the model. The project farm input loan relational model is presented in Fig 2 .

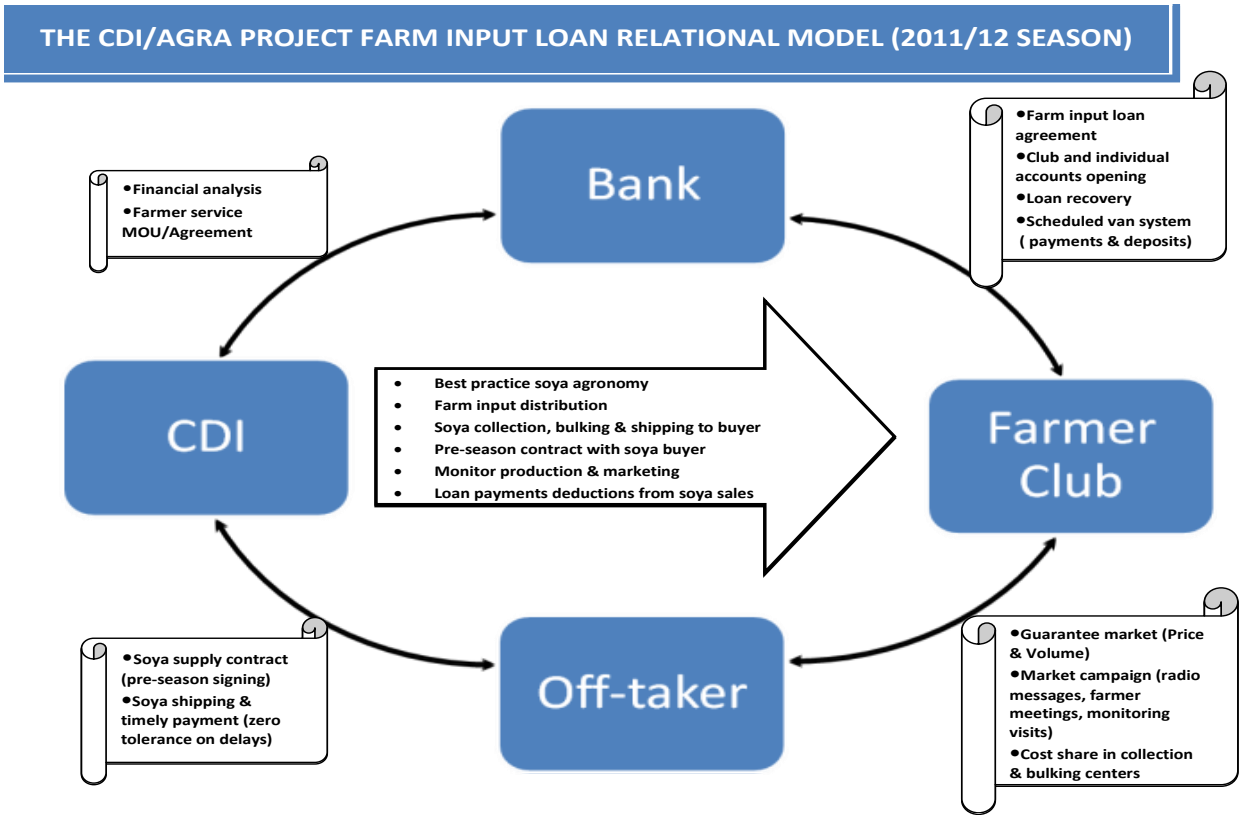


Figure 2: The CDI Market Linkages Model.

1.5 Data collection methods

The data collection methods used in this evaluation included; household survey, focus group discussions, interviews and case studies. A brief description of the sources of data and analytical techniques is discussed below:

1.5.1 Household Survey

The household survey of beneficiaries was conducted to capture relevant information. An appropriate sampling technique was employed to sample out the required number of respondents. The idea was to combine the proportionate sampling technique with multistage sampling technique. This process required data on number of households in the target areas to help in various levels of the sampling process. A statistical formula (Kothari, 2004) was used to determine the required sample size and it

yielded 320 households. The number of households from each EPA was then determined proportionately. Table 1 below shows the sampling structure (planned and actual).

Table 2: Sampling Framework

MCHINJI DISTRICT	Farmers Registered1	Proportion of Households	Number of Household to be Contacted	Actual Number of Households Contacted
EPAs				
Mlonyeni	3250	29%	92	134
Kalulu	2152	19%	61	54
Mkanda	1924		54	51
		17%		
Msitu	2263	20%	64	36
Mikundi	986	9%	28	22
Chiosya	759	7%	21	33
TOTAL	11,334		320	330

About 330 households were sampled for the survey across the six Government Extension Planning Areas (EPAs) of Mchinji District where the anchor farm business model is being implemented and the survey was conducted in each of the EPAs.

1.5.2 Stakeholder Consultations and Key Informant Interviews

The first step of the study involved undertaking comprehensive consultations with stakeholders and holding key informant interviews. The key stakeholders that were consulted included relevant Government officials and the private sector institutions that are playing a leading role in the supply and value chains of the commodities in question. The stakeholders involved included agro-dealers, CDI project leadership farmers, breeders, seed companies, transporters, policy makers, extension organizations, lead famers, farmer's associations/clubs, local leadership, financial institutions, buyers and aggregators of farm produce.

Meetings and structured interviews conducted aimed at soliciting information on how the various program players view the success and/ failure of the project, assessing the practical implementation of the project, their involvement and lessons learnt. The consultants used a combination of check lists, questionnaire and focus group discussions to collect information from stakeholders. Furthermore, results and findings from the desk review and the stakeholder discussions will be

[1] These are total farmers registered with CDI

presented to stakeholders for discussion and feedback. The results of the meetings will be incorporated into the final report.

1.5.3 Desk Research/ Literature Review

Desk research involved a review of project documents and reports written based on the project activities since the inception of the projects. The Project Monitoring & Evaluation Unit provided the evaluation team with internal studies and reports from which relevant information was extracted. The Evaluation Team reviewed key documents produced by grantees, program officers and other partners. Such documents included the background program document, grant proposals, project progress and final reports, consultancy reports, and other documents related to the project. The evaluation team also reviewed relevant literature related to the assignment and carried out data collection using approved methodologies by the AGRA M&E Unit to obtain information that meets the objectives of the evaluation. The following documents were reviewed; the original Project proposal drafted in 2009 by CDI; the Grant Narrative reports compiled by the CDI Project Manager and Project Team from the start of the Project in 2010 to 2013, the Project, implementation Plan (PIP) for the Project, project audit report compiled by AGRA, and relevant data and documents received from the AGRA Team or downloaded from the AGRA website.

1.5.4 Focus Group discussions

Focus Group Discussions were held to facilitate discussions with the target beneficiaries in selected communities to get a feel of the impact and the changes they see arising from the project. A checklist based on the project objectives and selected indicators was used to facilitate FGDs. Focus group discussions were held with various groups across the Project areas. Specifically five FGDs were done with lower end beneficiary groups in the villages where household surveys were conducted in five Government extension planning areas (EPAs) of Mchinji District where the anchor farm business model is being implemented.

1.5.5 Field Observations

Field observations are crucial as they offered an understanding of the Project's physical and social setting. These were used to validate facts from reports and compare the realized achievements with what had been planned in the project implementation plan. Field observations were used to assess the agronomic practices of farmers participating in the Project and compared these with best practices and with the project targets. Field observations were also used to verify some of the claims

and comments made by respondents during the focus group discussions and key informant interviews.

1.5.6 Case studies

Sometimes there would be a risk of drawing hasty conclusions and making generalizations when breaking transcripts and field notes up into thematic categories. These were avoided by writing case studies and narrative summaries, which highlighted the context and particular characteristics of key pieces of the project being evaluated. Data was collected about beneficiaries from using direct observations, interviews, protocols, tests, examinations of records, and collections of writing samples.

1.6 Analyzing and Interpreting Data

The evaluation information collected were described, analyzed, interpreted, and a judgment made about the meaning of the findings in the project context. Interpretation involved looking beyond the raw data to ask questions about what they mean, what the most significant findings are, and what conclusions and recommendations could be drawn from these findings.

1.6.1 Quantitative Analysis

Quantitative data analysis was done using SPSS 20 and STATA 12 software and involved interpreting the numerical findings considering the project context. As implementers of project activities are most knowledgeable about the context, they worked together with the team to assess whether the figures made sense, whether they adequately reflected project results, what possible explanations were for unexpected figures, and what conclusions and recommendations could be drawn from the figures.

1.6.2 Qualitative Data Analysis

While some accounts resulting from in-depth interviews and focus group discussions are stand-alone illustrations of important themes of the evaluation, it was found to be valuable to analyze qualitative data more systematically. Analysis of qualitative data from interview transcripts, observation field notes or open-ended surveys helped to identify similarities across several accounts, as well as directions, trends and tendencies. Data were categorized into recurrent themes and topics that seem relevant to answer the rapid assessment objectives.

1.7 Limitations of the Study

The study had a number of limitations as follows:

- The budget was significantly affected by the AGRA's taxation policy. The first payment, which was meant to finance data collection, was less than the planned cost for data collection due the reduction arising from taxation.
- The study was conducted during the rainy season. Many roads were impassable and thus affected the data collection exercise.

The data collection exercise, however, was done effectively despite the hurdles. The number of households that were contacted (330) exceeded the target number of 320.

2 RESULTS AND DISCUSSIONS

2.1 Adequacy of project structure and delivery mechanisms to realize the intended objectives

The review was satisfied that project goal, objectives and strategies are well stated and clear to staff and other stakeholders. In the original project design, AGRA advised CDI to reach out to farmers through Government Extension officers and Lead farmers for sustainability. CDI had only one field officer then, in 2010. This approach failed because once Government Extension workers had been trained by the project, they could not go to train lead farmers and farmer club because they wanted to be paid allowances. This was both outside Government policy and beyond the scope of the project budget. The approach was changed so that service delivery should be through CDI field officers and a network of lead farmers. CDI increased field officers from one in 2010 to six by 2013 (currently increasing further to twelve by July 2014). Due to rapid scale-up, there was need to have an M&E placement. The project budget did not have scope for this and AGRA had recommended use of government M&E officers at district assemblies. This was not practical. CDI ended recruiting its own M&E manager in March 2014. This structure is believed to enable the project deliver on the intended objectives.

The project is built on a business model (the anchor farm) which will enhance project sustenance. It has to be noted that there is very high local demand for soybeans in oil manufacturing industry. This project intends to satisfy this local demand and export demand and raise farmer incomes. The market linkages model is very unique in that it directly links farmers to the market (input and

output) ensuring that the farmer gets the price that has been negotiated with the buyer. This approach does not depress farm income as do other market linkages models in which the farmer organization buys farm produce from farmers and sells to buyer capturing benefits of arbitration. The whole project will transform most farmers from smallholder status to semi-commercial and commercial because of the infrastructure (farm implements and warehouses, warehouse receipt system).

The project is relevant to the needs of the smallholder farmer in Malawi and it is addressing the relevant problems along the agricultural value chain. Low agricultural productivity in Malawi is attributed to low use of improved seed and fertilizer as well as the lack of access to markets. Addressing these problems is expected to improve productivity and incomes of farmers.

2.2 Project Performance

In this section, findings from household survey, previous internal and external evaluations as well as progress reports are presented, and the extent to which project objectives have been achieved is assessed. The analysis is guided by the key performance indicators presented in the project results framework (Table 1). In the assessment, focus was on each of the project components by analyzing the extent to which key performance indicators were accomplished.

2.2.1 Objective 1: Increasing access to improved soybeans seeds through multiplication on the anchor farm and at Chitedze Research Station as well as procurement from seed companies

Lack of access to improved seeds is cited as one of the major constraints to improving agricultural productivity in Malawi (Longwe-Ngwira et al. 2012, Kamkwamba 2012). The Guide to Agricultural Production (2008) pointed out that the national average yield for soybeans in Malawi is estimated at 1.2 tons per hectare while potential yield for the crop (Solitaire, Sorocco, and Soprano varieties) is at 4.5 tons per hectare under good management. Similarly, in the case of maize, the national average yield has remained at 3 tons per hectare against potential yield of 4 to 5 tons per hectare under good management (Guide to Agricultural Production, 2008).

Kamkwamba (2012) noted that price elasticities for marketed legume seeds in Malawi are high implying that most farmers would prefer using recycled seed than buy improved seed at a market price. Most farmers have largely been relying on recycled seed or if they use improved seed, management is problematic because of lack of exposure to good agricultural practices. As such, it

was envisioned an important development objective of the CDI project to overcome this constraint by supporting farmers to produce their own hybrid seeds at the anchor farm, supplemented with procurement of improved seed from seed companies.

2.2.1.1 Expected Outputs

The expected output for the objective was increased availability and planting of improved certified soybean seeds from the current nearly 0% of seed planted to 100% through strategic partnerships and efforts of Chitedze Research Station, CDI, and domestic seed companies. This output had a number of indicators including increased number of soil samples and test kits collected per month and in year 3 respectively. The target was to collect and test 2,625 soil samples, and distribute 535 soil test kits for each of the 525 farmer groups by year 3 of project implementation. Another indicator was the number of site-specific fertilizer formulation targeting 2,625 fertilizer samples in August of year 3 and 525 fertilizer guides every year. It was also expected that a number of inspection visits to certified hybrid maize and soybean seed contract growers would be made between February and July of each year for maize and at least five visits per year for soybeans respectively. It was finally, envisaged that 525 on-farm agronomic, and soybean processing and utilization demonstrations would be conducted in year three of project implementation. Access to improved seed was estimated at 80% of all soybean and maize seed planted implying achievement of this objective by 80%. The specific details of other indicator components of this objective have been discussed under output performance section below.

2.2.1.2 Relevance

The CDI project sought to promote self-help initiatives in the provision of seed by introducing seed multiplication at the anchor farm where there would be initial support and then famers graduate from receiving assistance from the project. The provision of improved seeds is in itself within the set priorities of the Government of Malawi's ASWAP (focal area a (i)) and the CDI project to improve food security and farm incomes.

2.2.1.3 Output performance in terms of effectiveness

Soil Sampling and testing

Soil sampling and testing was a key component of the project for the purpose of providing recommendations for limiting and site-specific fertilizer formulations. CDI contracted Chitedze

Research Station to conduct soil analysis. It later contracted Bunda College which analyzed soil samples from demonstration sites because Chitedze Research station failed to provide the service. Bunda did soil sampling and testing on 108 Lead farmer farms. Soil sampling and analysis results showed that most soils are acidic, hence the need to correct acidity through liming and planting of acid tolerant crops. Soil organic matter content was also low in most soils. However, the targeted 2,625 soil samples were not achieved, and the 535 soil test kits were not distributed to each of the 525 farmer groups by year 3 of project implementation. Key informant interviews with project staff revealed that this was so because of delays in releasing soil sampling results. This represents achievement of this output by only 4 percent. To this extent, it can be concluded that this component of the project was dismally achieved.

Site-Specific fertilizer Recommendation

The project also contracted the Green Belt Fertilizer Company of Zambia which conducted soil sampling at CDI anchor farms in Mchinji and Kasungu Districts because Bunda College did not avail site-specific fertilizer recommendations. Site-specific and limiting fertilizer recommendations for the anchor farms have been attached in annex 7.7. GBFC provided recommendations for 41 soya fields under Mpherero, Kaundula and Farm 68 anchor farms. Against, the targeted 2625 samples, this represents achievement of this output by only 1.5 percent. Much as a farmer may not fully appreciate the importance of site-specific fertilizer recommendations, results of this study show the need for more fertilizer recommendations and distribution of test kits to farmers by the project.

Certified Hybrid maize and Soybean production inspections

The famers' hub was a seed multiplication center for farmers. Inspection visits were conducted to check germination percentage, weed incidences, pest and disease incidence, crop vigor and impact of dry spells. The farmer's hub was also involved in distribution of SeedCo soybean seed. It was observed in the 2012/2013 season that SeedCo seed had high germination percentage (over 90%). However, farm saved seed had poor germination owing to poor storage facilities at CDI's Mpherero anchor farm. CDI field officers made a minimum of two visits per farmer club per month for inspecting hybrid maize and soybean seed production; and against the targeted five visits per year, it can be said that this output was achieved.

Amount of certified soybean seeds produced on the anchor farm

By the end of February 2011, soybean seed was planted at the anchor farm in Mchinji District on a total of 156 hectares of farm land. Of the 156 hectares, 69 hectares was contracted with SeedCo Malawi Ltd and 87 hectares of soybean seed was planted using parent material from SeedCo Malawi Ltd under direct registration with Seed Testing Unit at Chitedze Research Station. From this, a total of 300 tons of seeds was harvested. In addition, plant breeder seed was also obtained from Chitedze Research Station from which 50kgs of Nasoko breeder seed was planted on 0.4 hectares of land and 50kg of Makwacha breeder seed was planted on another 0.4 hectares of farm land for seed multiplication. From this, about 600kg each of Nasoko and Makwacha breeder seed was harvest at a productivity rate of 1.5tons/ha. In 2013, CDI was given 550kgs of Tikolore breeder seed for multiplication at Mpherero farm to generate foundation seed for the FTF/INVC project. However, information on the yearly yields since seed multiplication started was not available. These seed production contracts that the anchor farms get calls for expanding seed production for the benefit of farmers and also to meet external demand.

Farm Input Loans

To facilitate access to improved soybean and maize seeds, CDI made negotiations with Opportunity International Bank of Malawi (OIBM) to grant agricultural loans to enable farmers access high quality inputs at wholesale prices. CDI had also linked project farmers to NBS Bank to enable them access farm input loans. The Banks required farmers to deposit 15% of their loan requirements as cash collateral. NBS Bank approved a total loan of MK109 million (see annexed table 23). The interest rate for bank loans has varied over the years and is driven by the bank rate and inflation rate. For 2013/14 season it was at 42% and for 2012/13 season it was 37%.

However, it should be noted that repayment rate for the loans has also varied over the years due to a number of reasons. Repayment rate for OIBM loans in 2010/11 season is unknown because the bank provided no financial literacy, no field visits to follow up on loans and there was poor soy seed germination at Mpherero farm. For NBS loans in 2011/2012 season, repayment was about 90% because of good rainfall and good soya prices. In 2012/2013 season repayment was at 60% for NBS loans because of market failure (Kwacha had appreciated and Government had imposed a ban on legume exports which pushed soya prices down from MK180/kg to MK100-120/kg and most farmers sold at Mk140-150/kg. It can be concluded that the project has made efforts in making

farm inputs accessible to farmers. Repayment of loans is dependent on finding good markets for farmers by CDI and providing financial literacy and following up of loans by the banks themselves.

Amount of certified soybean seeds procured from seed companies

Using funds obtained from bank loans, farmers were able to purchase seeds on loan and on cash basis. The seeds came together as a package of inputs for distribution on cash and/or loan basis. The key inputs that were distributed to farmers for commercial soybean production included sprayers, soybean seeds, soybean inoculants, insecticides (Karate) and fungicides. Project reports indicated that 55,780kg of soybean seed was distributed on loan and 30267.9kgs on cash basis. This shows that in the long run, most of the farmers will be able to buy inputs on their own using proceeds from project activities. This will critically, enhance project's sustainability.

Access to improved seed

Access to improved seeds was measured through availability and affordability of improved seeds to farmers. The study indicated that about 79% had access to improved maize seed and about 82% had access to improved hybrid soybean. The results were statistically significant at 99% confidence level[2].

Table 3: Proportion of Farmers having access to improved maize and soybean seeds

Crop Variety	Improved	Not Improved
Hybrid Maize	78.5	21.5
Hybrid Soybeans	81.7	18.3

On average, it can be said that about 80% of the farmers had access to improved maize and soybean seeds. This indicates achievement of the first objective by 80 percent which is very commendable. The results also showed that project participants had better access to improved seeds than non-participant.

Percentage of farmers planting certified maize and soybean seeds

It was necessary to verify the percentage of farmers planting improved seed because access to seed do not necessarily mean adoption of those seeds. Table 4 below show the percentage of farmer planting improved seeds by crop type.

[2] Significance test for proportions

Table 4: Percentage of farmers who planted improved varieties by crop type

Crop variety	Frequency	Percentage
Improved Maize	278	84.2
Improved Soybeans	276	83.6

The results above indicate that a higher proportion of farmers planted improved maize as compared with local maize at 99% level of significance. The same is true for soybeans. Edriss and Phiri (2011, unpublished) indicated that at baseline, only 34% (n=133) grew hybrid soybeans, and about 94% (n=133) grew hybrid maize. In terms of achievements towards the objective, it can conclusively be said that the project improved access to improved maize and soybean varieties. Furthermore, there has been a significant improvement with regards to planting of improved soybean varieties of about 50%. However, there is a slight drop of about 10% with regards to planting of improved maize varieties. On a yearly basis, the following table shows the planned and actual number of farmers who grew improved soybeans between 2009 and 2013.

Table 5: Number of farmers growing improved soybeans

	Baseline	2010/11		2011/12		2012/13	
		Plan	Actual	Plan	Actual	Plan	Actual
Number of famers	168	1,875	2,192	7,800	3,750	25, 384	3,910

The set targets were not achieved from 2011/12 to 2012/13 growing seasons. There is still need to promote adoption of improved seeds by strengthening agricultural advisory services. Agricultural extension would help in explaining the benefits of using improved seed through trainings and demonstrations and hence encourage more farmers to adopt improved varieties.

It would also be of interest to understand the sources of improved seeds for farmers within the project. Table 19 in annex 1 shows a list of seed sources for the farmers. It has to be noted that the Farmers Hub is also a local agro-dealer but it was separated from other "agro-dealers" to verify its contribution through seed multiplication on the anchor farms. Results showed that most of the farmers sourced their maize seeds from local agro-dealers (54.4%), and only 1.5% sourced their seeds from the farmers' seed hub. Most of the hybrid soybean varieties came through bank loans (86.8%) and only 2.3% was produced through seed multiplication. When compared with baseline

values, results indicated that the sources of improved seeds for maize have remained constant with 54.4% of the farmers (n=283) sourcing them from agro-dealers. There has been a slight drop in the sourcing own maize seeds from 5.7% at baseline to 3.3% currently. In the case of soybeans, there is a significant drop in sourcing seeds from agro-dealers (21.2% at baseline), farmers (28.3% at baseline), and use of own seeds (22.2% at baseline).

2.2.1.4 Efficiency

The project has been very efficient in utilizing resources to achieve this objective as it has registered significant progress towards improving seed accessibility through agricultural loans. However, seed multiplication at the anchor farm has not been very efficient. The fact that most of the farmers are sourcing their seed from agro-dealers at a market price means that there has been little effort from the project to make seeds locally and sustainably available to farmers.

2.2.1.5 Sustainability

The CDI business model for the anchor farm is currently being up-scaled. The introduction of seed multiplication is a good sustainability mechanism for the project because when the farmers, together with extension workers, have been properly trained, they would be able to continue producing seeds for their own farms as well as other farmers and companies within their vicinity. This is a good business which would improve incomes of participating farmers and help sustain project activities beyond project's life span. Secondly, agricultural loans will greatly enhance sustainability since farmers will be to finance their own input purchases other than relying on the project.

2.2.1.6 Challenges

The major challenge had been that of proving limiting and site-specific fertilizer recommendations for farmers. It took a lot of time to have soil analysis results ready because of lack of commitment from partner institutions (Chitedze Research Station and Bunda). However, lack of site-specific fertilizer recommendations has never been a barrier to fertilizer adoption. The value of site-specific fertilizer recommendations is that a farmer is better guided on selecting the most appropriate fertilizer type and application rate.

It had also been hard to provide sufficient incentives to influence farmers' prompt repayment of loans to the extent that some famers who defaulted their loan repayments were deregistered from

farmer clubs. Survey results indicated that about 56% (n=117) fully repaid their loan and about 9% (n=114) partly repaid their loans. In addition, many of the farmer clubs failed to secure sufficient collateral for accessing bank loans. Compounding this problem further was the fact that financial institutions could not participate in farm input lending program because of their insistence that either CDI or the off-taker (farm produce buyer) be the loan guarantor. This, to some extent, limited access to improved seeds.

2.2.1.7 Lessons learnt

It had been observed that local seed companies excessively priced improved seed and were unwilling to allow CDI anchor farms to pack seed on-farm and distribute to farmers under the seed company brand name as they wanted to be collecting proceeds on proprietary rights of their parent seed material. The lesson learned is that CDI should develop its own seed business by initially multiplying and distributing improved seed that has been developed by the Government of Malawi national research programs and its partnering CGIARs such as IITA (for soybean); ICRISAT (for groundnuts) and CYMMIT (for maize).

2.2.1.8 Recommendations

The following recommendations can be made as regards output one.

i. There is need to hire soil technicians who can perform soil analysis for the farmers other than outsourcing the services of other institutions.
ii. There is need to strengthen the role of seed multiplication at the anchor farm so that farmers can access seeds at their convenience. CDI should develop its own seed business other than relying on other sources of seed.
iii. There is need to improve promptness in repayment of loans by farmers so that more famers are able to access loans for commercial production and graduate from subsistence farming. CDI should enforce its farmers to repay loans, and Banks should make sure that they follow up on their grants.
iv. There is need to improve agricultural advisory services (more farmer training) to improve adoption of improved varieties.

2.2.2 Objective 2: Improving the agronomy of maize-soybean rotation systems and develop appropriate fertilizer recommendations for soybean-maize rotations, building on earlier work in Malawi on 'best-bet' practices for legumes that was supported by the Rockefeller Foundation.

According to Mughogho (1989), most soils in Malawi have low nitrogen content and most of them have huge quantities of sequioxides that fix phosphorus into unusable forms. Furthermore, many studies have shown that soil fertility is greatly improved in rotations of legumes and cereals because legumes are biological nitrogen fixers. In addition to this, many trees like Leucaena, Senna, Faidherbia, Tephrosia and Gliricidia are known to help in improving soil fertility.

The project sought to address problems of pests and diseases that attack maize and soybeans through crop rotation which is known to break pest and disease cycles. One lesson learned from the pilot implementation of the CDI anchor farm soybean project in the 2008/09 growing season involving 168 smallholder out-grower farmers was that both farmers and extension workers had little or no knowledge of how to control pests and diseases once they occur in both soybean and maize fields. In line with this, the anchor farm promoted best-bet practices for legumes which are basically practices aimed at breaking continuous mono-cropping effects and improve crop productivity including crop rotation and intercropping within the context of conservation agriculture.

2.2.2.1 Expected Output

It was envisaged under this project that agronomic practices that improve and maintain soil health would be promoted. The anticipated outputs under this objective included the expansion of the number of farmers receiving agronomic instructions for soybean from 168 to 30,000 by 2012, 75% percent of smallholder farmers in the project area practicing crop rotation of soybean with maize and use conservation agriculture, farmers practicing maize growing with fertilizer trees, 15,750 farmers in applying site-specific fertilizer recommendations in their field by year 3 of project implementation, and finally, increased soybean and maize yields from average 1,200kg/ha and 2,600kg to 2,000kg/ha and 4,000kg/ha respectively.

2.2.2.2 Relevance

The objective reaches out to the needs of the targeted group since it directly influences agricultural productivity. Soil fertility is a current issue and of important consideration in Government policy.

The issue is that agricultural production has predominantly been low over the years and there is greater attention towards improving it. Achievement of this objective would ensure food security and improved farm income for farmers as outline in MGDS II and the ASWAp.

2.2.2.3 Output performance in terms of effectiveness

Extension workers and Lead farmers trained on integrated soil management practices (ISFM)

After acquiring knowledge and skills, Government Extension workers trained lead farmers and farmer club members on ISFM practices. ISFM was a combination of methods, both organic and inorganic for improving soil health. Quantitative and qualitative information showed that for ISFM, emphasis was on terracing, mulching, minimum tillage, crop rotation, planting grass strips, afforestation, agroforestry, contour farming and conservation agriculture. It is, however, concerning to note that the project has never introduced any activity in respect of climate change and environmental degradation issues in the communities according to FGDs. At total of 1,933 Government field Extension staff and 525 lead farmers were trained on best agronomic practices for soybeans. Table 20 in section 7.5 shows the number of Government Extension workers and Lead farmers that were trained on best soybean agronomy practices between 2010/11 and 2012/13 growing seasons. This shows achievement of this objective by 271% for extension workers and 246.7%.

Farmers trained on integrated soil management practices

Government Extension workers and CDI staff trained farmers on various aspects of ISFM including terracing, mulching, minimum tillage, crop rotation, planting grass strips, afforestation, agroforestry, contour farming and conservation agriculture. By the 2012/2013 growing season, a total of 25, 384 farmers had been trained. This shows a significant progress towards reaching 30,000 farmers with ISFM practices. The following subsections shows the actual numbers and proportions of farmers that practice various components of ISFM

Farmers making contour ridge alignment for soil and water conservation

A relatively smaller proportion of farmers made contour ridges on their farms for soil and water conservation. About 8 percent (n=288) practiced contour farming on their first farms, 9.7 percent (n=238) on their second farm and 14.6 percent (n=213) on their third farm. This shows low adoption of contour ridging technology. Results also indicated that about 8 percent (n=213) were aware of contour ridging but did not practice it on their first and second farms and about 2.8

percent were aware but did not practice it on their third farms. Results also show that most of the farmers were not trained on this technology. This calls for extension officers to train and demonstrate this technology to famers.

Farmers applying organic manure/fertilizer

These farmers were first trained on the importance and application of organic fertilizers. Results showed that a good percentage (68.5%, n=298) of farmers were not trained on organic fertilizer application. It would also be important to find the number of farmers that actually applied organic fertilizers on their farms. Manure in this context is organic matter used as organic fertilizers. It is decomposed plants and animal material that is applied to improve soil fertility. This included farmyard manure (nkhuti), bokash, liquid manure, and prunnings of fertilizer trees. The table below shows percentage of farmers that applied organic fertilizers in the fields.

Table 6: Percentage of farmers applying organic fertilizer

Use of Manure	Frequency	Percentage
Yes	169	59.51
No	114	40.49

The table above shows that a bigger proportion (60%, n=284) of farmers actually applied organic manure on their farms relative to those that did not apply (40%). The baseline study reported that about 60% (n=323) of the farmers applied organic fertilizer (manure) to maize or soybeans in the 2009/2010 growing season. This shows that the project has not influenced more farmers to apply organic fertilizers in their fields. In terms of the trend over the years, the following table indicates that the project achieved little in making more farmers apply organic manure. This indicates that there is a gap that needs to be narrowed down.

Table 7: Planned against actual number of famers applying organic manure

	Baseline	2010/11		2011/12		2012/13	
		Plan	Actual	Plan	Actual	Plan	Actual
Number of farmers applying organic fert	194	6,300	3,150	10,500	5,450	15,750	10,021

Farmers applying site specific inorganic fertilizer formulations to soybean and/or maize crops

As indicated under objective one, the project only managed to provide fertilizer recommendations for 41 soya fields under Mpherero, Kaundula and Farm 68 anchor farms. However farmers did not manage to access these because they were released only for the anchor farms. In addition, against a target of 15,750 farmers, this shows very slow progress towards achieving this objective. There is need to strengthen provision of site-specific fertilizer formulations by locally sourcing technicians to work in this field, and secondly, to train more farmers through demonstrations on beneficial impacts of using these recommendations.

Farmers growing fertilizer trees

The project was promoting Glyricidia and Tephrosia as fertilizer trees. But adoption of these tree species has been quite low as every season they were grazed off by goats and cattle. Interestingly, the vast majority of farmers were retaining regenerates of indigenous tree species and some of these were fertilizer trees. Farmers retain the trees for firewood, poles as well as soil fertility improvement. This kept the number of farmers keeping fertilizer trees relatively high. Table 8 below shows the number of farmers that grew fertilizer trees over the project period.

Table 8: Number of farmers growing fertilizer trees

	Baseline	**2010/11**		**2011/12**		**2012/13**	
		Plan	Actual	Plan	Actual	Plan	Actual
Number of farmers growing fertilizer trees	897	6,300	3,150	9,450	7,088	15,750	14,164

Source: 2012-2013 CDI project narrative report

Results of study indicated that about 70% of the farmers were trained on fertilizer trees and about 57% of the famers were actually planting fertilizer trees. This shows a decline in number of farmers that actually planted fertilizer trees from the total number that was trained. However, FGDs indicated that for ISFM, farmers were planting fertilizer trees. Some farmers did not because of lack of land. Very few farmers use agroforestry in their gardens since the program is new in this area. There is, therefore, need to train more farmers on planting fertilizer trees and demonstrations on the beneficial impacts of these trees.

Farmers practicing cereal-legume crop rotation

Maize-Soybeans rotation was promoted in the project and famers were trained on the importance and how to rotate the two crops. The technology was promoted to sustainably manage soil fertility while at the same time complementing it with other soil fertility enhancement mechanisms like manure application. Results of the study indicated that about 90% of the farmers were trained on cereal-legume rotation and only about 10% did not receive the training. In terms of practice, 84.5% reported using the technology on their farms (see annexed table 21), implying that about 70% of the 30,000 targeted farmers were practicing this technology. Most of the farmers (79.9%) reported being trained on this technology by CHDI Staff, and 17.2% reported having been trained by Government Extension staff while only a small proportion (2.9%) reported having received the training from other NGOs.

Crop Yields

The main thrust of the project was to improve crop production and productivity. As such, all the interventions were geared towards achieving this major objective. This warrants special attention to determine whether yields really improved under the project or not. When asked if yields improved or not, 72% of the farmers reported that yields significantly improved under this project than before; while only 28% reported that yields did not improve under the project. To get a clear picture of yields that were obtained in the 2012/2013 growing season, crop yields were analyze separately. The table below shows the yield obtained from the different varieties of maize and soybeans.

Table 9: Yields (kg) in 2012/2013 growing season

Crop	N	Mean	Minimum	Maximum
Hybrid Maize	272	1,063.7	2	7,500
Local Maize	49	670.5	3	3,850
Hybrid Soybeans	277	537	1	3,350
Local Soybeans	8	136.9	20	400

The mean crop yield is far below the targeted 4000kgs for maize and 2000kgs for soybeans. However, the results showed that about 3% of the farmers managed to harvest at least 4000kgs of hybrid maize and only 2% for local maize. Furthermore, about 3% managed to harvest at least 2000kgs of hybrid soybean and none managed to reach this level of production for local soybeans.

This indicates a production gap for the average farmer and the need to strengthen agronomic and husbandry practices to improve agricultural production for the majority of the farmers. The analysis further dissected crop production to understand crop productivity under the project. The table below shows crop productivity (Yield/Ha).

Table 10: Crop productivity (Kg/Ha)

Crop	N	Mean	Minimum	Maximum
Hybrid Maize	269	1618.5	2.5	11,242.9
Local Maize	47	1279.6	3.0	4,941.9
Hybrid Soybeans	274	976.8	2.5	4,138.9
Local Soybeans	8	488	197.7	988.4

The results indicate that on average, the project failed to reach productivity levels of 4000kg/ha for maize and 2000kgs/ha for soybeans. Notwithstanding this, about 6% of the farmers managed to reach the targeted productivity level for hybrid maize, 4% for local maize, 9% for hybrid soybeans and none for local soybeans. Comparing this with baseline values, productivity for maize was on average 2.3 tons/ha against the current 1.6tons/ha. This shows a productivity drop of about 38%. Yields for hybrid soybeans were 0.74 tons/ha with an average production of 0.16tons against the current 0.98 ton/ha and average production of 0.5tons. Productivity for hybrid soybeans has increased by about 32% on average. In terms of average production, it can be said that soybean yields have improved by about 233.8%. When compared with non-participants, it was observed that the mean productivities were 1356.5kg/ha for hybrid maize, 1600kg/ha for local maize, 858kg/ha for hybrid soybeans, and 362kg/ha for local soybeans. This means that the project improved yields of participating farmers relative to non-participants and that productivity has mainly improved for soybeans than maize.

However, project documents indicated that productivity increased in 2012/2013 growing season. Productivity for improved soybeans was estimated at 2tons/ha reaching the targeted 2tons/ha for the project, and productivity for improved maize was estimated at 5.5tons/ha. It has to be noted that productivity estimates reported in project narrative reports were based on yields at demonstration plot yields3 which did not incorporate farmer garden yields. As such, the farmers'

3

$$Productivity\ (Kg/ha) = \frac{\text{Total fresh wt. (kg)) } * \text{ (subsample dry wt. (g)) } * 10}{\text{(Subsample fresh wt.(g)) } * \text{ (area harvested (m2))}}$$

estimates of productivity provided reliable information of what was really happening on the ground. It should, however, be cautioned that farmers' estimates may be affected by under-reporting due to measurement errors on area and NBS farm input default (afraid that if they report high, they would be pressurized to repay NBS loans).

Table 11: Actual and planned yields and hectares

	Baseline	**2010/11**		**2011/12**		**2012/13**	
		Plan	Actual	Plan	Actual	Plan	Actual
Improved soybean bean yield (t/ha)	0.74	1.5	1.3	1.8	**	2.0	2.0
Improved maize yield (t/ha)	2.3	3.5	4.8	3.8	**	4.0	5.5
Hectares under soybean beans (Ha)	67.2	750	1,205	3,120	**	8,400	4,322

Note: ** indicates missing of data

Source: 2012/2013 CDI project narrative report

2.2.2.4 Efficiency

In terms of efficiency, it shows that the resources devoted towards improving agricultural productivity especially for soybeans through improved agronomic practices have been worthwhile as noted by higher productivity gains as compared to baseline values.

2.2.2.5 Sustainability

Sustainability of these interventions is likely to be positive because of the large number of lead farmers and Extension workers including farmers themselves who have been trained in ISFM practices. ISFM practices bear fruits in the long run hence the need to emphasize trainings and demonstrations to make sure that these practices become part of their farming lives.

2.2.2.6 Challenges

The major challenge had been to reach more farmers with trainings in places where there were mobility challenges. This is why it was important to train more lead farmers because they are ever present in their communities for famers to contact them. Secondly, there had been delays in providing site-specific fertilizer formulation as it has been explained in sections above. It should be noted that the Green Belt Fertilizer Company released these recommendations in August 2013 and

that these were only for the anchor farms and not farmer fields. In addition, even if farmers applied these, their impact would not be felt as farmers had not yet harvested their crops when the study was being conducted. Yield estimates in this study are based on what was harvested in the 2012/2013 season. This calls for the project to engage the partner institution furthermore to provide recommendations for farmer fields.

2.2.2.7 Lessons learnt

Lead farmers remain a strategic resource in the farmer training programs. But neglecting training of extension workers does not work because it creates a knowledge gap between farmers and extension workers and the latter can confuse farmers if they don't know what farmers have been taught. Thus, Government extension workers still need to be trained as they are key opinion leaders in local communities.

2.2.2.8 Recommendations

There is need to improve access to agricultural extension to improve adoption of technologies by farmers. For most of the technologies mentioned above, the number of farmers that were trained is greater than the number of those that used them. There is need to overcome constraints that farmers face when they want to try a new technology. Training on manure application should be strengthened so that poor farmers can still harvest some crops even when they do not have sufficient funds to procure inorganic fertilizers. There is also need to provide cite-specific fertilizer recommendations for famers.

There is also need for the project staff to be estimating yields from farmer gardens not just in demonstration plots to have a realist picture of productivity levels.

2.2.3 Objective 3: improving extension services through the combined use of Government extension workers and lead farmers that would be empowered

Since the early 1980s, Malawi has been pursuing market liberalization policies and the restructuring of the Government marketing board (ADMARC), which entailed allowing the private sector to participate in input and out marketing of smallholder produce. These economic reforms have had a major impact on Government extension/agricultural credit, which in turn has affected the performance of smallholder agricultural production negatively because the private sector failed to fill the gap left by the Government.

As a consequence the ratio of extension staff to farmers is too high, currently standing at 1 to 2,000 compared against a recommended ratio of 1 to 500-750. Other than the high extension worker- farmer ratios, the majority of Malawi's agricultural extension workers lack competences in the following areas: agronomic skills in non-traditional crops like soybean, livestock development, irrigation development, farmer organization development, participatory development tools, and business development. At the inception of the project, it was reported that both extension workers and farmers in the project areas had little idea on the best practice soybean agronomy especially on plant populations for optimum yields, pest and disease control, use of herbicides, appropriate fertilizer formulations and amounts to apply.

It was further observed that while the agricultural extension policy promoted the use of lead farmers as providers of extension services to supplement formal extension worker services, most of the traditionally selected lead farmers tended to be old and lacked dynamism to be true agents of change and adapt to change; most of them are not functionally literate hence find it difficult to assimilate new teaching of technologies. Lead farmers also lacked incentives to work on voluntary basis to assist fellow farmers as this involves a significant opportunity cost. Thus, the project envisaged introducing a modification of the Lead farmer extension model along the lines of CDI pilot implementation of this concept in the cotton project in Neno District and anchor farm soybean project in Mchinji District.

2.2.3.1 Expected Output

The expected output for this objective was strengthened capacity for smallholder farmers, and extension workers within the anchor farm area and beyond.

2.2.3.2 Relevance

The provision of agricultural extension services is crucial for improving technology adoption as well as improving productivity. The Government recognizes the importance of agricultural extension as outlined in the ASWAp to accelerate technology adoption since most farmers are illiterate and lack proper guidance.

2.2.3.3 Output performance in terms of effectiveness

Training of Lead farmers

This performance indicator target was largely achieved. The assessment found that CDI field officers trained lead farmers on several topics as initially planned, including best practice Soybean agronomy, ISFM, gross margin analysis, demonstration plot establishment and management, pest and disease identification and control, pesticides spraying, farmer club formation and management, Soybean harvesting, storage and marketing as well as farm input loan administration. A total of 1933 lead farmers were trained by the end of 2013, a figure much higher than the planned project target of 848 lead farmers (Table 18). The project had a target of ensuring that at least 30% of the lead farmers are women. However, the trained number of female lead farmers accounted for about 45 percent of the lead farmers trained, suggesting that the project over-achieved the planned target. Lead farmers in turn trained farmers in their respective clubs (farmer-to-farmer training).

Focus Group discussions with farmers revealed that community members seldom monitor group members' plots. It is the lead farmers who monitor club members' plots and give advice wherever necessary. The lead farmers are always busy giving extension services to fellow farmers. It can be said that lead farmers have been very key in delivering extension services in their communities. The presence of lead farmers has also been a critical success factor for the project.

Table 12: Farmer Extension capacity development

	Baseline	**2010/11**		**2011/12**		**2012/13**		**Cumulative target**	
		Plan	Actual	Plan	Plan	Plan	Actual	Plan	Actual
Extension workers trained in farmer organization development	3	11	35	14	47	28	76	53	158
Lead farmers trained in farmer organization development	11	63	177	260	408	525	1348	848	1933
Farmer clubs formed	11	125	159	510	408	1400	1348	2035	1915
Farmer clubs with capacity development plans	11	125	159	510	408	1050	1348	1685	1915

Key informant discussions with project staff revealed that the majority of farmers closely followed and were excited with the training, more especially on topics such as gross margin analysis, which allowed them to compare investments in different crop enterprises, especially comparing Soybean to tobacco, maize and groundnuts. The gross margin analysis tool was perceived as empowering to farmers in making decisions to grow Soybean beans.

Training of Government extension workers

Consistent with the training for lead farmers, the project also met its planned target of training Government extension workers from 3 at baseline to 158 by the year 2013 (annexed table 20). As indicated in Figure 3, the project overachieved the planned target of training 53 extension workers by 198%.

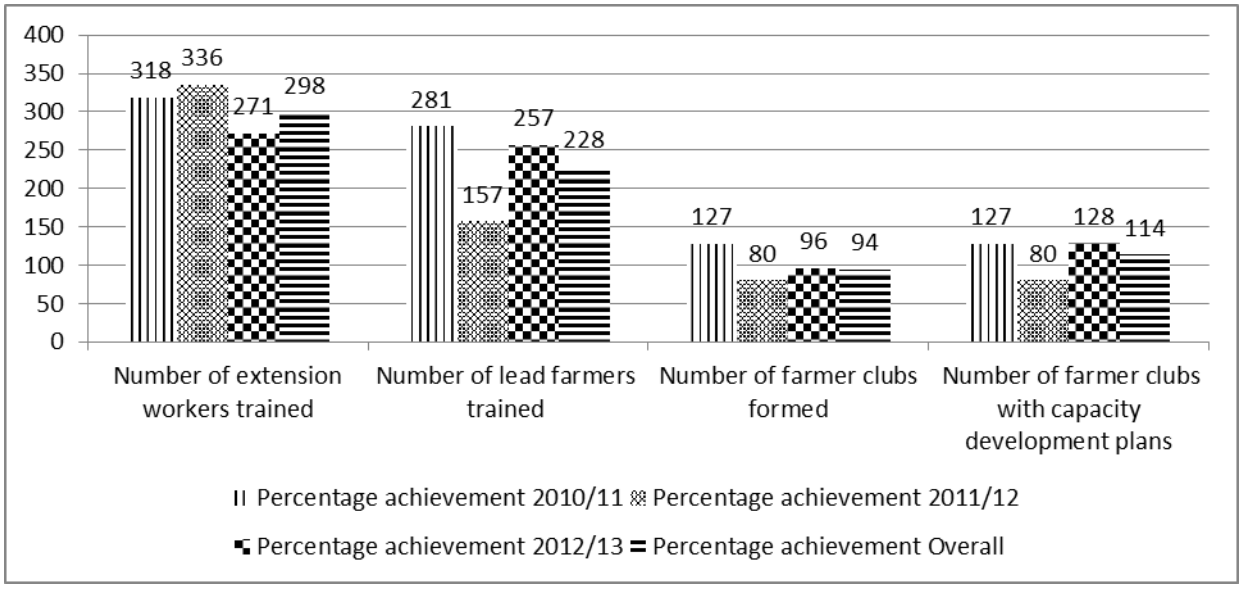


Figure 3: Percent achieved of planned capacity building outputs

Focus Group discussions indicated that extension officers helped very much in establishment of demonstration plots and conveying agricultural messages to farmers. Farmers were also encouraged to call extension officers whenever they needed assistance, for instance, forming clubs. In Kanjerengo Village, farmers reported that they became aware of the CDI/AGRA project through the extension officer who came and requested them to work with the project. After that the extension officer sensitized the village of the program so that whoever was willing to participate should join the group. Thereafter, he came and asked for a place for demonstration plots to plant

soybean and maize using different technologies. This shows that extension officers helped very much in getting the project known by communities.

Formation of farmer clubs

The project had a target of forming 2035 farmer clubs by the end of the project. As shown in Table 5, 1915 farmer clubs were formed by 2013. This presents an achievement rate of 94% (Figure 3).

Number of farmer clubs with capacity development plans

The project had envisaged to train farmer clubs to develop capacity development plans. The target was to help at least 1685 farmer clubs to develop capacity development plans. This objective was achieved as 1915 farmer clubs had developed capacity development plans by the year 2013.

2.2.3.4 Sustainability

For sustainability, the project built the capacity of both Government extension agents and lead farmers through knowledge and skills training. This is useful in addressing the problems of attrition among extension workers (through retirement, posting, resignation or death). Farmer clubs formed are also an important institution that will enhance the sustainability of project activities as farmers will continue to share information on new technologies, markets etc. during club meetings. Farmer clubs further contribute to the building of social capital which is crucial for farmer access to all sorts of information needs for the enterprise growth. Capacity development built by each farmer club will enhance skills of club members and in many ways strengthen the clubs further and contribute to the sustainability of the project activities.

2.2.3.5 Lessons learnt

Although the project trained a lot of Government extension workers and lead farmers it was observed that they faced some challenges. Training of lead farmers is likely to help the project achieve its sustainability objectives as well as assist in scaling up extension services to more farmers. The challenges include following:

i. Most extension workers expected CDI to be paying them field allowances for training farmers in their assigned areas (sections), which is against current Government policy. Besides, CDI had no budget for paying extension workers to train Lead farmers;

ii. Most of extension workers had mobility challenges in that they rely on bicycles and they complained of low and infrequent bicycle maintenance allowances;

iii. Most extension workers cover large areas and are responsible for over 3,000 farmers each. This makes it difficult to effectively reach out to all farmers using push bikes. In this regard lead farmers remain a strategic resource in the farmer training programs. However, Government extension workers should continuously be trained to update their knowledge and skills required to promote the adoption of new technologies.

2.2.4 Objective 4: developing structured access to markets through strong links with food and feed industry using the anchor farm as the conduit

The vast majority of farmers in Malawi are not organized. The largest farmer organization, NASFAM, has about 110,000 individual members against a total population of about 2.6 million farm families in Malawi. This complicates market arrangements in terms of collective bargaining for farm input prices through bulk procurement and produce prices through contractual marketing of crop produce at competitive producer prices. In part, the lack of effective farmer organizations is essentially due to lack of farmer organization competences. The lack of organized groups imposes high transaction costs by both farmers and buyers during marketing season. Farmer fragmentation increases the risk factor amongst financial lending institutions and makes farm input distribution practically difficult, including the distribution of inputs under the Government farm input subsidy program as the identification and traceability of individual farmers becomes problematic.

2.2.4.1 Expected Output

The objective was to secure competitive and reliable markets for smallholder soybean and maize farmers. The expected output was improved market access by farmers. The output had a number of indicators. First, the project set as a target to improve farm gate prices to within 10% of processor FOB price or import parity for both maize and soybean. At baseline, maize FOB price was at US$ 200 per MT while soybean FOB price was at US$ 380 per MT. The second indicator was the volume and value of soybean and maize sold to preferred buyers. The project had set as a target 9,450 tons of soybean and 15,750 tons of maize to be sold to preferred buyers in the third year of the project. A third output indicator was the number of farmers with regular access to soybean and maize market information. The project targeted to increase the number of farmers accessing market information from 168 at the baseline to 30,000 by the third year of the project through provision of market information to farmer groups. By September 2013, over 25,384

farmers had received market information through their farmer groups. A detailed discussion on the performance of this component is presented in the output performance section below.

2.2.4.2 Relevance

Most of these smallholders in Malawi practice subsistence farming and operate largely in local markets due to lack of connectivity to more lucrative markets at provincial, national or global levels. Smallholders, due to their small surpluses in production, generally are exposed to higher degree of risk and transaction costs. As a result, incentives remain weak, investments remain low, and so does the level of technology adoption and productivity, resulting into low level equilibrium poverty trap. While information technology, roads, ports, market infrastructure play a significant role in linking farmers to markets, institutional innovations can also play an important role in reducing the marketing risk and transaction costs in the process of exchange between producers and consumers. This objective was therefore quite relevant as it aimed at addressing this problem by linking farmers to structure markets (both financial as well input and product markets) and hence addressing both the problem of market risk as well as that of high transaction costs.

2.2.4.3 Output performance in terms of effectiveness

The project targeted to facilitate at least 9 supply contracts between farmers by the end of the project and this was achieved by 2013 as 11 supply contracts had been made. Key seed companies CDI has been contracting with for seed crops (hybrid seed maize, seed Soybean and seed groundnuts) grown at CDI anchor farmers are: SeedCo (hybrid seed maize, seed Soybean and seed groundnuts); Pannar (hybrid seed maize; seed Soybean), and, Funwe (hybrid seed maize and seed groundnuts). Funwe limited, SeedCo ltd and Pannar Seed supplied hybrid maize, groundnut and soybean seed. Key commercial Soybean buyers CDI has been contracting are: a)MALDECO Fisheries Ltd; b)Senwes Grainlink/Bunge; c)Transglobe Export Produce Ltd; d)Farmers World; e)Dalitso General Supplies. For instance CDI signed Soybean supply contracts for the 2010/11 crop were as follows: MALDECO (700 tones); Transglobe (118 tones); and Senwes (300 tones); Seed Soybean for SeedCo (126 tons).

The table below shows the trends in amount of soybean and maize grain sold to contract buyers since the project inception. There was no information on the quantities sold for both crops for the year 2013. Results show that in 2011 the project met the project target of selling 844 tons and 730 tons of soybeans and maize, respectively. The project did not meet its target in the subsequent year

and there was no information in the third year. Efforts were made to capture missing information on the volume of soybean and maize sold in 2013, but the project team had not yet aggregated the data.

Table 13: Sale of commodities through structured markets

	Baseline	**2010/11**		**2011/12**		**2012/13**	
		Plan	Actual	Plan	Actual	Plan	Actual
Supply contracts with buyers	1	2	3	2	3	3	5
Volume of Soybean sold through contract buyers (t)	30	844	1244	4212	660	9450	
Volume of maize sold through contract buyers (t)	0	750	19	10000	415	15750	

Source: CDI's 2012-2013 Project narrative report

The project staff monitored market information on Agricultural Commodity Exchange (ACE) Africa Ltd listserve as well the private trader prices in all the 6 EPAs on a weekly basis. The information was later shared with farmers. The project also linked farmers to reliable Soybean and maize markets such as at Senwes Grainlink in Lilongwe.

Negotiation on farm input prices and producer prices

CDI entered into a series of price negotiations with key farm input suppliers and produce buyers. On farm inputs, the key suppliers that CDI negotiated with were Cropserve and their Zambia based partner, Agrifocus, and Farmers organization.

With regard to producer price negotiations, CDI had discussions with several Soybean buyers including: CP Feeds; Transglobe Ltd; and Senwes/Bunge. Of these, Senwes/Bunge offered the best base price of $450/mt and accepted to sign a pre-season Soybean purchase agreement. Consequently, CDI proceeded to contract with Senwes/Bunge for delivery of a minimum of 1,000 mt of Soybean bean. CDI guaranteed the supply of this volume with Soybean bean produced from its own anchor farms, in the event that smallholder farmers decided not to deliver to Senwes. Unfortunately, Government's banning of export of all legumes in April 2013, the unforeseen and

rare appreciation of the Malawi Kwacha in May 2013, and Government delays in issuing export permit made Senwes/Bunge to overly delay signing the Soybean purchase agreement such that CDI had to look for another large buyer, Farmers World, who agreed to buy at a competitive price of MK170/kg delivered Kanengo (Lilongwe) at a time Senwes/Bunge was offering MK155/kg delivered Kanengo (Lilongwe).

The contract base prices were $500/ton for soybean and $100/ton for maize. With such good prices for soybean, it can be concluded that the project achieved its objective of increasing soybean farm gate prices, while maize prices remained low. This in turn generated farmer confidence in the market and stimulated farmer interest to scale up the production of soybeans.

The project was also meant to assist smallholders in accessing bank loan and bank accounts. This involved making presentations for soybean profit and loss accounts to key financial institutions for buy-in and submitting farm input loan requirements for 4,000 farmers. In June 2013, about 3000 farmers accessed loans for farm inputs from NBS bank through the negotiation process facilitated by CDI. This led to significant achievements with regards to linking farmers to financial markets. However, repayment rates for the loans variable as indicated in section 2.2.1.3.

2.2.4.4 Sustainability

For some interviewed farmers' groups in Mchinji, the project sustainability was felt to be hampered by the lack of storage facilities before the purchase of their crop. They see scope in establishing warehouses to avoid destruction before moving to the market. Sustainability based on existence of other farmers groups in Mchinji was also evident. The fact that marketing groups have been established and been linked to the banks and the traders is a great achievement for the project. As long as the farmers continue producing the commodities, they can be assured of traders that will buy their commodity; however, the major risk to sustainability is the erratic soybean prices that can discourage farmers from growing the crop.

Also related to sustainability is the risk associated with overdependence on rain fed agriculture. The fact that none of the farmers producing soybean and maize practice irrigation is suggestive of the risks they face in a bad/drought year. Thus, the marketing system established is only reliable if farmers produce the crop under good rainfall but it will fall apart whenever drought occurs.

2.2.4.5 Challenges

The study also identified various aspects of project implementation that may require attention. The major challenge is that both the source and quality of seed differ significantly. Discussions with project staff revealed that seed produced by SeedCo performed much better than seed from other sources such as Panner. In some instances, the germination rate was reportedly low which led to low productivity. This also led to difficulties in farmer repayment of loans and hence farmers' withdrawal from the loan scheme. The challenge is consistent with challenges faced by all farmers in sub-Saharan Africa where rain fed agriculture is predominant and where insurance and credit markets are virtually missing.

2.2.4.6 Lessons learnt

The idea of sourcing the market before the product is produced is a good one. Nonetheless, while CDI has been contracting with large buyers, project farmers have not reacted positively to contract markets – so far, farmers have not been keen to deliver to contract buyers, even though the contracts have guaranteed minimum volume and producer prices. CDI has now decided to add another market instrument, "warehouse receipts program" to enable farmers deposit their farm produce in a warehouse operated by CDI and wait for the right prices. Meanwhile, farmers can draw down some funds from a partner financial institution on commercial lending basis and use the deposited commodity as collateral. Farmers have welcomed this instrument and CDI has planned to construct a 500mt community warehouse at Nabulenje in Mlonyeni area in Mchinji District in 2014.

Another lesson learn is that there is lack of understanding on forward contracts leading to increase default cases as evidenced by three farmer organization defaulting the SENWES contract.

Finally, Government policy can actually hinder progress on critical agribusiness activities conducted by farmer organizations. It is therefore important that while the project focuses on direct support to farmer organizations to access markets, it also considers macro-economic factors that may undermine progress and impact of project activities.

2.2.5 Objective 5: enhancing the processing and utilization of soybeans

The objective was to improve the nutritional status of farmers through locally available soybeans. Soybeans are known to be rich in proteins and thus highly demanded of infant children and people

living with HIV. Processing of soybeans and proper utilization of soybeans was therefore promoted under the project.

2.2.5.1 Expected Output

Under this objective, the project sought to reach about 75% of smallholder farmers with in-house training of soybeans utilization. This would be achieved through a number of indicators including on-farm demonstrations (soybean processing and utilization), Lead farmers and Extension workers trained on soybean based recipes for human food and livestock feed, number of farmers trained in preparation of soybean based meals against target, number of new use and products from soybeans, finally, and number of times these recipes are consumed. A detailed discussion on achievements towards these output indicators has been presented under output performance section below.

2.2.5.2 Relevance

Household nutrition is an important policy area in the current era of increase malnutrition due to poor quality foods and dearth of food itself. The Government of Malawi promotes nutrition sensitive development approaches to meet the needs of infants and expectant mothers. This project sought to provide farmers with information on how to prepare soybean based recipes for nutritional benefits.

2.2.5.3 Output performance in terms of effectiveness

On-farm soybean processing and utilization demonstrations

Processing of soybeans was an important part of the project due to the understanding that food nutrients are affected by the way in which food is prepared. Even highly nutritious foods may lose their nutrients because of the way they are handled. Therefore, food preparation was emphasized and promoted through training and on-farm demonstrations. However, the total number of on-farm processing and utilization demonstrations conducted since the project started is not known.

Lead farmers and Extension workers trained in soybean processing for humans and livestock

Soybean based food recipes were prepared and showcased during field days. This generated a lot of interest amongst households and farmer groups. Presently, there is interest to pursue home-based soybean processing and One Foundation of UK has so far expressed interest to pursue this. To

properly disseminate information on soybean based food recipes, Lead farmers and Extension workers were trained on the same. Project reports indicated that adoption of soybean based foods and consumption increased with increased number of farmers growing soybeans.

Table 14: Lead farmers and Extension workers trained in soy bean processing

	Baseline	**2010/11**		**2011/12**		**2012/13**	
		Plan	Actual	Plan	Actual	Plan	Actual
Number of lead farmers trained in soybean processing	0	63	177	260	408	525	1348
Number of Extension workers trained in soybean processing	0	3	35	14	47	28	76

The table above indicates that in all the years, the actual number of lead farmers and extension workers trained in soybean bean processing was increasing against the planned number. The project achieved the targeted 525 lead farmers and 28 extension workers trained on soybean processing by year three of project implementation.

Farmers trained in preparation of soybeans based meals

The trainings were extended to farmers so that they know how to properly utilize soybeans for nutritional benefits. Project reports indicated that against a target of 30,000 farmers being trained in soybean processing, the project managed to reach 25, 384 farmers by year three of project implementation. To triangulate this information, rapid assessment survey data was analyzed to understand the proportions of farmers trained on and practicing soybean based recipes. Results of the study shows that most of the farmers were aware of chikondamoyo made from soybean flour. However, it seems soybean milk and sweet potato-soybean futali was new to most farmers. Since, awareness was low, it was necessary to find the number of farmers that were trained on these recipes. The table below shows the percentage of famers that were trained on various soybean recipes.

Table 15: Percentage of farmers trained on soybean recipes

Recipe Training	Frequency	Percentage
Chikondamoyo		
Yes	164	52.4
No	149	47.6
Soybean milk		
Yes	81	26.2
No	228	73.8
Sweet Potato-Soybean Futali		
Yes	14	4.5
No	295	95.5

The percentage of awareness is also reflected in the number of farmers that were trained on these soybean-based recipes. There is a gap that needs to be addressed to make more farmers aware of these soybean recipes. These new recipes would increase the number of ways in which soybeans can be consumed and be used to improve household nutritional status.

Soybean processing/products

The farmers were asked what products they processed soybeans into after harvest. The table below shows the various products and intermediate products that were derived from processing soybeans.

Table 16: Soybean products

Product	Frequency	Percent
Chikondamoyo	34	10.2
Flour	67	20.4
Porridge	2	0.6
Zitumbuwa	1	.3

Of the 330 respondents, only 10.2% reported processing soybeans into chikondamoyo, 20.4% into flour, 0.6% into porridge and only 0.3 percent into zitumbuwa. This shows low processing of soybeans into other products. There is need to strengthen processing of soybeans to make it usable in various forms that are highly demanded and lucrative.

Consumption of recipes

Household nutrition is better improved when people who have learned are able to practice their knowledge in their cooking and preparation of food. It was therefore important to understand the

practice part on food utilization. Farmers were asked to indicate their frequency of consuming these recipes. The table below shows these frequencies and percentages.

Table 17: Frequency of consuming recipes

Recipe consumption	Frequency	Percentage
Chikondamoyo		
Weekly	157	58.1
Fortnightly	74	27.4
Monthly	39	14.4
Soybean milk		
Weekly	34	57.6
Fortnightly	8	13.6
Monthly	17	28.8
Sweet Potato-Soybean Futali		
Weekly	29	42.6
Fortnightly	38	55.9
Monthly	1	1.5

The results indicate that consumption of soybean in the form of soy milk and sweet potato-soybean futali was also low among the sampled households. There was low awareness of these recipes, low training, and hence low utilization.

2.2.5.4 **Efficiency**

Very few number of farmers have so far adopted new soybean based recipes implying that the trainings did not achieve more in terms of influencing farmers' decisions to start using these recipes. There is more that still need to be done in this area to make more households start using soybean based meals.

2.2.5.5 **Sustainability**

If farmers can properly be trained on processing and utilization soybean based recipes, the intervention can remain in the communities for as long as possible. Some of these recipes can be prepared on a business basis because soybean milk for example is highly demanded in hospitals and school feeding centers. Thus, apart from raising the income earning potential of farmers, the proceeds can be used to purchase other food items that would raise the nutritional status of households.

2.2.5.6 **Challenges**

The major challenge was that of reaching more farmers at once because demonstrations on food processing require a close contact between the trainer and trainees. Furthermore, the number of

people actually practicing was lower than that which was trained, implying that there was need for more concentrated efforts on farmer training.

2.2.5.7 **Lessons learnt**

Most farmers do not know about recipes like sweet potato-soybean futali and soybean milk. Most farmers were excited to learn about them but they have not put them into practice. These are new areas that need to be researched to understand consumer tastes and preferences before they can continue being advocated.

2.2.5.8 **Recommendations**

There is a lot that has to be done to improve utilization of new recipes like soybean milk and sweet potato-soy futali to improve household nutritional status. More of a one-to-one approach would help farmers adopt new techniques on soybeans processing and utilization. There is also need to include actual assessment of nutritional status of household members that use soybean based meals to gauge the effectiveness of the intervention towards improving household nutrition.

2.2.6 **Objective 6: Building strong and effective farmer organizations affiliated to the National Association of Smallholder Farmers of Malawi (NASFAM).**

Objective 6 of the CDI Project is based on the fact that the vast majority of farmers in Malawi are not organized. Farmer fragmentation increases the risk factor amongst financial lending institutions and makes farm input distribution practically difficult, including the distribution of inputs under the Government farm input subsidy program as the identification and traceability of individual farmers becomes problematic.

2.2.6.1 **Expected Output**

Table 24 below shows the achievements of the project with respect to Objective 6 from the baseline time (2009/10) to the 2012/13 growing season. The expected outputs for this objective were the number of extension workers trained in farmer organizations, number of lead farmers and extension workers trained in farmer organizations development, number of farmers clubs formed and number of farmers clubs with capacity development plans. At the beginning of the project there were only 11 Lead farmers and 3 extension workers, 11 farmer clubs formed and only 11 clubs with capacity development plans. By the end of 2012/13 growing season, the project had 1,348 lead farmers and had formed 1,348 clubs.

2.2.6.2 Relevance

The relevance of farmers' organizations in the development of rural people cannot be over-emphasized. As indicated earlier, farmers' organizations constitute the much needed social capital through which farmers put their resources together to access viable commodity markets and negotiate for their input and output prices. The approach of using farmers organizations is thus in line with Government of Malawi Policy of encouraging farmers to work collectively through clubs, associations and cooperatives. In this way, the use of farmers' organizations is a very relevant approach.

2.2.6.3 Output performance in terms of effectiveness

As explained in section 2.1.6.1 the project has effectively managed to achieve all its outputs expected. The only exception was the number of farmer clubs formed by CDI. Even then, the project achieved 96% of this output. This shows that the activities associated with Objective 6 were effectively executed.

The performance of the project has been impressive so far. For example, the goal was to train about 28 extension workers and 525 lead farmers by the third year of the project. By the third year these figures were surpassed by 171% and 157% respectively (see table below for the actual figures). The planned number of clubs formed was 1400, and 1348 (96%) were formed. Lastly, the planned number of clubs with capacity development plans was surpassed by 28% (1, 050 planned against 1348 achieved). All in all, the performance of the objective with respect to its indicators has been remarkable.

Table 18: Farmer organization development

DELIVERABLE BY OUTCOME	Baseline 2009/10	2010/11		2011/12		2012/13	
		Plan	Actual	Plan	Actual	Plan	Actual
Farmer organization capacity development							
Number of extension workers trained in farmer organization development	3	11	35	14	47	28	76
Number of lead farmers trained in farmer organization development	11	63	177	260	408	525	1,348
Number of farmer clubs formed	11	125	159	510	408	1,400	1,348
Number of farmer clubs with capacity development plans	11	125	159	510	408	1,050	1,348

Source: CDI 2012-2013 Project narrative report

CDI helped establish all of the farmers' organizations (especially farmers clubs as depicted in Figure 5 below). Over 85% of the respondents indicated that their Farmers' Organization had been established with help from CDI officers. In addition, the CDI officers also provided training to the FOs in a number of technical areas. The project area mainly has clubs as indicated in the figure below.

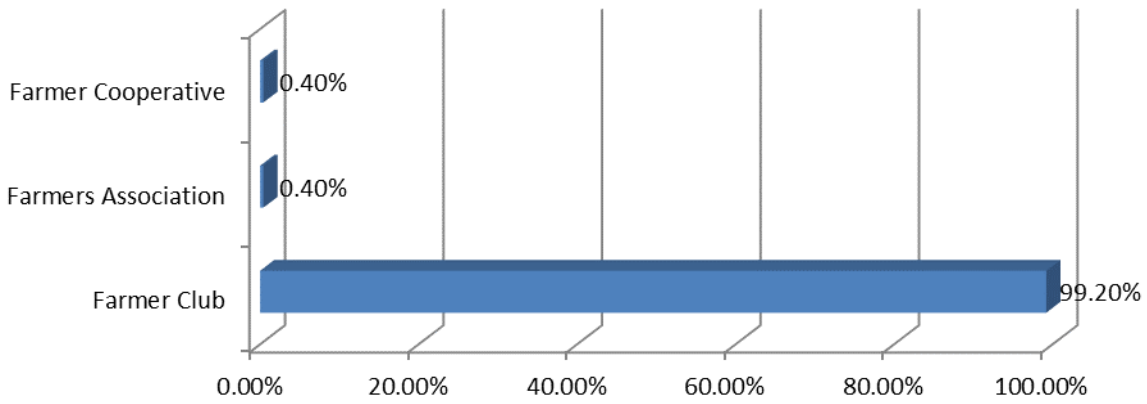


Figure 4: Type of farmers' groups for respondents

The figure above indicates that about 99 percent of the farmers were organized into farmer clubs, 0.4 percent into associations, and another 0.4 percent into farmer cooperatives. Most of these farmer groups were established under the guidance and supervision of CDI as the table below indicates.

Table 19: Proportion of Personnel/Institutions who helped establish farmers' groups

	N	Percent
CDI field officers	203	87.1
Government extension workers	17	7.3
Other NGOs	4	1.7
Other (Specify)	9	3.9
Totals	2334	100

Although the project has made such achievements, its intended collaboration with NASFAM did not go well as planned. The original idea was for NASFAM to be actively involved in the formation of the clubs. It however turned out that all the clubs were formed by CDI because NASFAM's involvement was not significant at all due to some technical differences that emerged between NASFAM and CDI at the beginning of the project. So NASFAM did was not involved in the formation of club, neither are clubs formed under the project linked to NASFAM. NASFAM's interaction with its members is basically on commercial basis where the farmers sell their commodities to NASFAM through its commercial arm called NASCOMEX. NASCOMEX then identifies lucrative markets for the produce and earns a profit through these transactions. CDI strategy on the other hand was to connect the farmers directly to the market so that the farmers could directly benefit from their agribusinesses.

2.2.6.4 Sustainability

To ensure sustainable FOs, CDI has been training the members through lead farmers. Each farmer club had a lead farmer. The farmer clubs selected lead farmers on the basis of established criteria, which included (a) cooperation and good reputation in his/her village (b) hard working and committed (c) disciplined and with good loan repayment track record (d) high technology adopter (e) has adequate landholding (minimum of 3 acres of arable land) and prepared to grow own crop (minimum 1 acre) being promoted by the project (f) to be exemplary and a fast learner.

CDI field officers have been training lead farmers on several topics including best practice Soybean agronomy, ISFM, gross margin analysis, demonstration plot establishment and management, pest and disease identification and control, pesticides spraying, farmer club formation and management,

[4] The figure reflects multiple responses

soybean harvesting, storage and marketing as well as farm input loan administration. Lead farmers in turn trained farmers in their respective clubs (farmer-to-farmer training).

2.2.6.5 **Challenges Faced by Farmers groups**

The focus group discussions conducted by the study team revealed a number of challenges that the FOs still faced. The challenges encountered by the farmers' groups included the following:

a) Lack of reliable markets for members' commodities and products;
b) Lack of enough seed loan to boost farming faster;
c) Most members were not committed in meetings;
d) CDI bought harvest at low price;
e) Farmers received bad seed;
f) Drought, fertilizer shortage, uncertified seed;
g) Didn't know where to buy inoculants;
h) Some members were not willing to repay back the loans; and
i) The late distribution of seed and chemicals

These are the challenges that need to be addressed if the farmers' groups are to continue perform satisfactorily.

2.2.6.6 **Lessons learnt**

1. The project has performed well as far as the indicators associated with strengthening of farmers' organizations were concerned.
2. Availability of reliable structured markets is still an issue that still needs to be addressed by the project. Farmers were not happy with the prices at which they sold their Soybean beans.
3. Farmers' organizations members still need sensitizations to elicit their commitment towards the activities and goals of their clubs. Many farmers expressed concern over poor attendance to meetings.
4. The project dealt with the problem of Soybean rust well by introducing inoculants for the farmers groups to use. However, it was learnt that some farmers were still struggling to identify reliable sources of the chemical.
5. Some of the Soybean seeds that the farmers received on loan were of poor quality and did not germinate well. This is a critical challenge because the project is meant to improve Soybean productivity and income.

2.2.6.7 **Recommendations**

In view of the lessons learnt related to Objective 6 of the project, the following recommendations have been drawn:

1. Capacity Building of the members of farmers' organizations in the area of FO development should be continued. Many of the farmers' organizations, especially farmers' clubs still face commitment challenges. These organizations can hardly be strengthened if members are not willing to work together. Training should include in basic principles of collective action so that the members can learn the value FO membership.
2. Quality of Soybean seed. The project should ensure that only certified high quality seed from credible sources is distributed to the farmers as this will improve crop productivity.
3. Markets: Farmers should be encouraged to identify their own markets through their groups, rather than waiting for CDI to identify markets for them. Where capacity is lacking, training will have to be provided.
4. Delivery of seed materials and other inputs should be done timely to ensure that farmers' field operations are not negatively affected.

2.3 Opinions of the project key stakeholders on the design, implementation structure and what went well, or not so well, in the project management

Interviews were conducted with project key stakeholders and they made the following observations:

<u>What went well:</u>

a) Identification of large buyers and negotiating soya supply contracts. CDI was able to contract such large buyers as MALDECO, Senwes, Farmers World, Transglobe.

b) ISFM and soya-maize best practice agronomy demonstrations were highly successful and field days which used these demos were also extremely successful.

c) Collaboration with multiple stakeholders and partners in the soya value chain was quite effective, except for the few where CDI experienced unprecedented challenges.

What did not go well

a) In the project design, CDI was to work in partnership with Chitedze Research Station on soil sampling and analysis as well as training of trainers. This did not take off as Chitedze implicitly did not like to have CDI as grant holder. This affected even soil sampling and analysis work – Chitedze did not attend much to CDI work. However, they were very helpful in the design of demo plots and seconding an agro-forestry soils lab technician, who was later absorbed by CDI.

b) Similarly, the partnership between CDI and ICRAF failed to work because ICRAF complained that a budget of $75,000 the project had set aside for their involvement on promoting conservation agriculture with fertilizer trees was not adequate and wanted double as much. AGRA did not yield to their demands so they opted out. However, partnership with IITA was quite fruitful as was the partnership with Department of Agricultural Extension Services.

c) CDI's efforts to reduce the price of high quality seed was not as successful because most of the soya seed varieties on the market belong to seed companies and were bred by them. Hence plant breeders' right are stringent and the seed companies do not allow any grower to multiply, pack and distribute their materials. This can only work for seed varieties developed by public research institutes such as national research programs and CGIAR institutes. Unfortunately, at the time there was limited breeder seed of such varieties for bulking and multiplication.

d) Although CDI was very successful in securing supply contracts, project farmers have not been keen to deliver their produce to markets identified by CDI as farmers prefer to sell in their villages and cash on delivery. This has led CDI to develop the warehouse receipts system as an additional market instrument as farmers will be able to wait for prices to rise while able to draw down cash from a partner bank using the commodity deposited in the warehouse as collateral.

e) While for most farmers this was affordable for soya inputs, there were very few farmers who could afford cash collateral for purchasing fertilizer for maize production. Thus financing focused on soya inputs. The project assumed farmers would get maize fertilizer and hybrid seed through own financing and luck ones through Government subsidy

program. The project did not systematically track farmers obtaining farm inputs for maize production through such alternative ways due to inadequate M&E capacity.

f) Establishment of high biomass and fast growing fertilizer tree species (Glyricidia and Tephrosia) has not taken off well in the project areas as livestock have been grazing these off. Researchers were surprised as Tephrosia is typically not palatable. There is now a school of thought that it is possible that in some agro-ecologies, Tephrosia converts from being non-palatable to being palatable.

g) Soya bean production strongly benefits from use of high quality inoculant. AGRA had linked CDI to MEA Fertilizer Company in Kenya who produce high quality soya inoculant branded as Biofix. Chitedze Research Station gave a lot of restraints to have this product widely promoted in Malawi yet the local inoculant at Chitedze is both limited in quantity and of variable quality.

h) In all the years banks were disbursing their loan products quite late and some farmers in areas where rains start earlier would miss the first planting rains.

2.4 Critical factors that may have supported or impeded the project in realizing its expected outcomes

The project has been influenced by a number of factors that have been key in determining its current position.

a) Formation of farmer clubs and farmer training was highly successful. This was largely due to the compelling demonstration effect at demo plots as well as dramatic increase in farmer level yields and revenues. Farmers have been increasing soya production typically from one acre in first year of adoption to 2 to 3 acres in their second year of scale-up.
b) CDI was able to secure seed growing contracts for hybrid maize, seed soya and seed groundnuts from SeedCo, Pannar and Funwe, for the sustainability of anchor farms. CDI is currently ranked as one of the key growers of SeedCo, the largest seed company in Malawi (controls over 70% of the seed market).
c) CDI successfully negotiated for farm input loans from two banks – Opportunity Bank and NBS Bank – despite the traditional negative attitude of banks in lending to smallholder farmers.

d) In the project design, CDI was to work in partnership with Chitedze Research Station on soil sampling and analysis as well as training of trainers. This did not take off as Chitedze implicitly did not like to have CDI as grant holder. This affected even soil sampling and analysis work – Chitedze did not attend much to CDI work. However, they were very helpful in the design of demo plots and seconding an agro-forestry soils lab technician, who was later absorbed by CDI.

e) Although CDI was very successful in securing supply contracts, project farmers have not been keen to deliver their produce to markets identified by CDI as farmers prefer to sell in their villages and cash on delivery. This has led CDI to develop the warehouse receipts system as an additional market instrument as farmers will be able to wait for prices to rise while able to draw down cash from a partner bank using the commodity deposited in the warehouse as collateral.

2.5 Success Stories from project Beneficiaries

See attached in Annex 2.

2.6 Efficacy of the different models utilized by the project

The main instrument the project used to increase farmers access to farm inputs was brokering their linkage to financial institution. Both Opportunity Bank and NBS Bank demanded 15% cash collateral for their loans.

The other key instrument was the marketing model in which farmers are directly linked to output markets. It this model, CDI has farmers on one end and output buyers on the other. The role of CDI is to identify markets for farmers and provide linkage. Then farmers enter into direct contracts with buyers and supply commodities. In this arrangement, the farmer gets the price that has been agreed upon negotiations with the buyer. CDI does not get any premium from providing this brokerage. This is different from other models in which the institution buys from farmers at a lower price and sells to buyers at a higher price internalizing the difference between what the farmer gets and what the buyer pays. CDI's arrangement does not depress benefits towards farmers.

2.7 Project influence on policies and investments by Government including National level scalability of the CDI model

The success of the project made it visible to policymakers – captured during field days and led to impact on policy. Government's Presidential Initiative on Poverty and Hunger adopted the anchor farm model in its legumes promotion and signed an MoU with CDI in Sep 2012 for CDI to provide

technical advice on soya production at Presidential Initiative's Rusa Farm in Mchinji. Recently, the Ministry of Trade and Industry also adopted the anchor farm business model as part of the pilot export processing zone project. They had requested CDI to be the lead implementer of this project but declined to avoid losing focus on its core project activities.

Further, the success of the project inspired President Bill Clinton to invite a large international delegation (about 80) to visit the project end of July 2013. After visiting the project, some of the delegates pledged support to the project and some of them have already started providing support. An example is the Rothschild Foundation that is supporting community warehouse initiative.

Other support leveraged by CDI as a result of the success of the project includes the GIZ grant of $3m dollars for the construction of 3 clinics at CDI anchor farms and another $3m for the replication of the anchor farm project model in Iringa, Tanzania.

The project has a great potential of national scaling. There is strong commitment currently by Government and other stakeholder to improve and strengthen commercial agriculture after many years of frustration with smallholder agriculture which has failed to lift the economy out of its plight. If there could be a number of similar projects around the country, of course adapting to suit local contexts, lives of many farmers could be transformed including the economy at large. Such efforts move in the same line as the Green Belt concept of making farming a commercial business for export markets.

However, for such a large scale national initiative to be effective, certain necessary conditions have to be fulfilled. These include:

i. Identifying competitive and lucrative export and domestic markets and securing supply contracts for soybeans and maize.
ii. Market liberalization especially in the case of soybeans because it is largely a cash crop than is a food crop for most farmers. This is a very critical condition because Government intervention in the market distorts incentives to production. Farmers would not be willing to participate in enterprises that are heavily controlled by government especially on output prices. Farmers need to be assured of high returns to their investments.
iii. There is need to improve access to agricultural credit and lower the risk of lending by financial institutions because such huge investments can only be possible with credit and

improve promptness in repaying loans. In the same vein, farmers need to develop a culture of borrowing and repaying and minimize the moral hazard problem.

3 GENERAL CHALLENGES AND GAPS

The project has so far been progressing steadily, though implementation faced a number of challenges as follows:

(a) The application of the Anchor Farm model has increased the demand for large-scale farm land. Identification and acquisition of such farm lands has been challenging. So far CDI has managed to acquire five large farms with a total farmland of 2,566 ha under long term sublease arrangements with Press Agriculture.

(b) CDI has faced challenges to practice legume-cereal rotation at anchor farms as the common cereal which is commercially viable has been seed maize. The seed market for Soybean is rather small at the moment.

(c) Input and equipment supply by locally based companies has been erratic due to challenges of foreign exchange. The project sought to partner with Universal Chemicals Industries (UCI) of India to register a customized agro-dealer business that procures and distributes farm inputs and equipment as recommended in the best practice agronomic protocols disseminated by the project.

(d) High quality legume seed is inadequate and its distribution is restricted to seed companies due to property rights. CDI has partnered with IITA under the USAID/INVIC project to assist on availability of Soybean seed by multiplying Tikolore variety of Soybean seed.

(e) Initially the project was to be implemented in some part of Mchinji District. The Government of Malawi however requested for universal District coverage. The demand meant a strain on the budget for the project.

(f) Getting partners on board was a challenge at the start of the project. Some partners (e.g. ICRAF) pulled out due to discontent associated with project funds. ICRAF was to help in afforestation/agro forestry for carbon sequestration.

(g) Distortions in Soybean markets. The Government intervention against Soybean exports plunged the prices of Soybean down. As such, farmers were forced to sell their Soybean at less than expected prices – much to their dismay.

(h) Working with financial institutions also had its own challenges due to lack of outreach capacity, inadequate financial literacy among the farmers (project beneficiaries) and

inadequate capacity to monitor repayments. Some farmers were even signing up for multiple loans which further complicated their ability to pay back.

(i) The other challenge faced by the project at the beginning was that agricultural extension officers were unwilling to work with project extension workers.

(j) Use of Soybean loans to repay non-CDI loans. Some farmers argued that they so because they had been forced by the non-CDI loan providers and that NBS were not very forceful in loan recovery.

(k) The other problem was that farmers had tied up their Soybean money in Village Savings and Loans (VSLs), as such they could not easily pay back the loans that they had taken from financial institutions.

(l) Emerging commercial farmers (smallholder farmers or new farmers emerging as medium scale farmers) have not been directly addressed. These could be vital facilitators such as operating tractor hire schemes in their areas, grain and fertilizer tree seed multipliers, commission agents in distribution of farm inputs, agency banking, mobile money agents, etc.

(m) Anchor farm business model to expand portfolio scope to include other priorities crops that have high market potential, livestock and value-addition activities. Regrettably, AGRA does not typically fund broad-based projects

4 LESSONS LEARNED

i. The produce markets are quite dynamic, especially the Soybean market. It is difficult to secure a pre-season supply contract. Once secured, it is difficult to guarantee availability of farm produce from smallholder farmers once trader prices start increasing as regularly as on a weekly basis. The lesson learnt from these market dynamics is that it is not enough to rely on pre-season Soybean contract but have a warehouse receipts program to support this. The lead facilitator on warehouse receipts programs is Agriculture Commodity Exchange Africa Limited. They are also a grantee of AGRA and piloted the warehouse receipts program in 2011, in partnership with Rab Processors, one of the agro-processors and commodity buyers as the collateral manager (holder of farmer commodities and issuer of warehouse receipts), and Opportunity Bank of Malawi. ACE reported that the pilot program was quite successful with price gains to farmers reaching as high as 70% plus.

CDI intends to participate in the warehouse receipt program as a collateral manager, using storage facilities at its anchor farms for hoarding farm produce. In this regard, CDI seeks the support of AGRA through its Market Access Program to develop the warehouse receipts program interventions.

ii. The fuel shortage can be mitigated by two methods. One, registering as a fuel importer and import fuel directly. But the experience by Ex-Agris Africa Limited, which is also implementing a similar program, is that there is a lot of bureaucracy in the fuel importation business. The second option is to partner with an existing fuel company and import through them by making off-shore payments to eliminate the foreign exchange constraint. This has worked well for CDI. It has been resolved that every anchor farm should have fuel storage and pumping facilities.

iii. The preparation and implementation of an agro-dealer business for procurement and delivery of farm inputs to project and non-project farmers seems to be a good strategy for improving the input supply chain. However, it was learnt that margins are quite small hence trading volumes need to be significant to make it a commercial viable business. The farm input loan program is a key driver of business volume. In addition, it has been learned that to maximize earnings in the farm input distribution business, it has to be run alongside a supporting business, especially commodity purchase and sales. Thus the warehouse receipts program could be linked to the agro-dealer business.

iv. Most financial institutions seem not ready to take the risk of lending to smallholder farmers. They prefer hedging the risk by lending through an intermediary as a loan holder or guarantor. This is not sustainable as the system can collapse once CDI pulls out. The lesson learned is that although Malawi has a lot of financial institutions, not all of them fit the anchor farm lending model presented earlier on in this report, where a lending institution has to deal directly with a farmer organization. The implication is that CDI needs to nurture the partnerships with the few banks that can take the risk of signing a loan contract with a farmer organization, as NBS Bank did. The other implication is that CDI must continuously work with the target farmers to develop a strong culture of credit discipline to maintain a sustained record of high loan recoveries. This will attract other financial institutions to come in and participate in lending directly to smallholder farmers.

v. To maximize the number of farmers participating in the commercial production of Soybean beans, it is clear that the timing of project events should be as follows:

   a. Dialogue with financial institutions to sensitize them on lending needs should be done in the period January to March.
   b. Formation of new farmer clubs (April to May)
   c. Briefing of farmer clubs by financial institutions, screening of farmer clubs eligible for lending, opening of group bank accounts and collection of cash collateral from farmer clubs (May to July).
   d. Promotion of cash sale of farm inputs (inviting input suppliers to conduct cash sales of farm inputs in strategic places in the target communities)
   e. Placing orders with suppliers for farm inputs on the loan program (June)
   f. Digital registration of farmers in farmer clubs that qualified for lending and met the minimum cash collateral requirements (August to September).
   g. Distribution of farm inputs to farmer clubs (October)

vi. It has been observed that local seed companies excessively price improved seed and are unwilling to allow CDI anchor farms to pack seed on-farm and distribute to farmers under the seed company brand name as they want to collect proceeds on proprietary rights on their parent seed material. The lesson learned is that CDI should develop its own seed business by initially multiplying and distributing improved seed that has been developed by the Government of Malawi national research programs and its partnering CGIARs such as IITA (for Soybean); ICRISAT (for groundnuts) and CYMMIT (for maize). CDI is currently seeking support from AGRA to develop this seed strategy through AGRA's PASS program.

vii. The combination of high quality improved Soybean seed, high quality inoculants, early planting and plant protection with insecticides and fungicides guarantees a farmer to obtain at least 2 tons of Soybean per hectare. Project farmers had one of the best Soybean crop in 2010/2011 season, yet they did not apply any inorganic or organic fertilizer to their fields. Thus, if farmers rotate the Soybean with maize (and fertilizer maize fields with correct fertilizer formulations guided by soil analysis results), and grow maize under conservation agriculture farming system, it should be possible to sustain high Soybean yield over time.

5 GENERAL RECOMMENDATIONS

In view of the challenges identified and examined, the Rapid Assessment Team has drawn the following recommendations for the smooth implementation of the project in the remaining period:

1. There is need to strengthen the role of seed multiplication through the anchor farm so that farmers access seed at any time they need it. CDI should develop its own seed business other than relying on other sources of seed.

2. There is need to improve promptness in repayment of loans by farmers so that more famers are able to access loans for commercial production and graduate from subsistence farming. This will require effective and efficient monitoring and continual sensitizations to elicit full commitment from loan beneficiaries to pay back and reduce loan defaults. In addition, while farmers can invest in VSLs, they need to be discouraged against tying up Soybean funds in VSLs and then fail to repay the loans.

3. There is need to improve agricultural extension by emphasizing training of farmers to improve adoption of improved varieties by employing and training more extension workers and lead farmers who would subsequently train more farmers and influence their technology adoption decisions.

   Capacity Building of the members of farmers' organizations in the area of FO development should be continued. Many of the farmers' organizations, especially farmers' clubs still face commitment challenges. These organizations can hardly be strengthened if members are not willing to work together. Training should include basic principles of collective so that the members can learn the value FO membership.

4. The project should ensure that only certified high quality seed from credible sources is distributed to the farmers as this will improve crop productivity.

5. Farmers should be encouraged to identify their own markets through their groups, rather than waiting for CDI to identify markets for them. Where capacity is lacking, training will have to be provided.

6. Delivery of seed materials and other inputs should be done timely to ensure that farmers' field operations are not negatively affected.

7. Marketing infrastructure: There is need for the project or similar projects to have a component of constructing new /long-term leasing existing community warehouses where

farmers can deliver their farm produce for sale under a receipt programme. AGRA funding, even the follow-on funding, did not make provision for this.

8. Build in seed business: It is clear that in future anchor farm projects need to have a thriving internal seed business to grow, process, pack and distribute improved seed using genetic materials bred by public research institutes. Regrettably, AGRA PASS (seed) program turned down CDI funds request for developing this component.

6 REFERENCES

Chirwa, E. *et al.* 2006. Farm-level productivity in smallholder tea farming in Malawi: Do contractual arrangements matter? Working Paper No. 2006/03.University of Malawi, Chancellor College, Dept. of Economics.

Denning, G., Kabambe, P., Sanchez, P., Malik, A., Flor, R., Harawa, R., Nkhoma, P., Zamba, C., Banda, C., Magombo, C., Keating, M., Wangila, J and J. Sachs 2009. Input Subsidies to Improve Smallholder Maize Productivity in Malawi: Toward an African Green Revolution**.** PLoSBiol 7(1): e1000023 (doi:10.1371/journal.pbio.1000023).

Kankwamba, H., Mangisoni, J., Simtowe, F., Mausch, K., and Siambi, M. (2012). Improved Legume Seed Demand Systems in Central Malawi: What do Farmers' Seed Expenditures Say about their Preferences? Selected paper prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguaçu, Brazil.

Longwe-Ngwira, A., Simtowe, F., and Siambi, M. (2012). Assessing the Competitiveness of Groundnut Production in Malawi: A Policy Analysis Matrix Approach. Selected Poster prepared for presentation at the International Association of Agricultural Economists (IAAE) Triennial Conference, Foz do Iguaçu, Brazil.

Malawi Government (2007). Malawi Growth and Development Strategy: From poverty to prosperity.

Malawi Government (2007).Malawi Growth and Development Strategy: From poverty to prosperity.

Malawi Government (2009).Mchinji District Agriculture Office report on crop production estimates for 2007/08 and 2008/09 seasons.

Mughogho, S.K. (1989). Soil fertility in Malawi: A review. University of Malawi, Bunda College of Agriculture, Lilongwe, Mala

7 ANNEXES

7.1 Project Objectives

i. Increasing access to improved soybeans seeds through multiplication on the anchor farm and at Chitedze Research Station as well as procurement from seed companies;
ii. Improving the agronomy of maize-soybean rotation systems and developing appropriate fertilizer recommendations for soybean-maize rotations, building on earlier work in Malawi on 'best-bet' practices for legumes that was supported by the Rockefeller Foundation;
iii. Improving extension services through the combined use of Government extension workers and lead farmers that would be empowered,
iv. Developing access to structured markets through strong links with food and feed industry using the anchor farm as the conduit,
v. Enhancing the processing and utilization of soybeans, and,
vi. Building strong and effective farmer organizations affiliated to the National Association of Smallholder Farmers of Malawi (NASFAM).

7.2 Main expected outputs and outcomes of the project

The main expected outputs and outcomes of the project are presented in Table 1 and they include:

i. Expansion of the number of farmers receiving agronomic instructions for soybean from 168 to 30,000 by 2012.
ii. Increased soybean and maize yields from average 1,200kg/ha and 2,600kg to 2,000kg/ha and 4,000kg/ha, respectively.
iii. Guaranteed markets for smallholder farmers' crops including supply to MALDECO Fisheries and oil processing companies.
iv. At least 75% of project smallholder farmers affiliated to NASFAM.
v. Increased availability and planting of improved certified soybean seeds from the current near 0% of seed planted to 100% through strategic partnerships and efforts of Chitedze Research Station, CHDI and domestic seed companies.
vi. Seventy-five percent of project smallholder farmers in the project areas have rotated soybean with maize, and use conservation agriculture to maize growing with fertilizer trees.

vii. Seventy-five percent of project smallholder farmers trained in-house utilization of soybean.

7.3 Analytical Tables

Table 20: Sources of Improved hybrid maize and soybeans

Source of Seeds	Hybrid Maize		Hybrid Soybeans	
	Frequency	Percentage	Frequency	Percentage
Local Agro-dealers	147	54.4	18	6.8
Farmers Hub	4	1.5	6	2.3
Given by Govt	74	27.4	1	0.4
Given by NGOs	4	1.5	1	0.4
Own Seed	9	3.3	5	1.9
Borrowed from farmers	3	1.1	0	0
Given by friends and relatives	9	3.3	4	1.5
ADMARC	3	1.1	0	0
Seed Company	2	0.7	0	0
Bank Loans	15	5.6	231	86.8

Table 21: Lead farmers and Extension workers trained on ISFM practices

	Baseline	**2010/11**		**2011/12**		**2012/13**		**Total**
		Plan	Actual	Plan	Actual	Plan	Actual	
Number of lead famers	11	63	177	260	408	525	1,348	1,933
Number of extension Workers	3	3	35	14	47	28	76	158

Table 22: Cereal-Legume rotation

Whether trained or not	**Frequency**	**Percentage**
Yes	272	90.1
No	30	9.9
Rotated or Not		
Yes	251	84.5
No	46	15.5

Table 23: Farmer Extension capacity development

	Baseline	**2010/11**		**2011/12**		**2012/13**		**Cumulative target**	
		Plan	Actual	Plan	Plan	Plan	Actual	Plan	Actual
Number of extension workers trained in farmer organization development	3	11	35	14	47	28	76	53	158
Number of lead farmers trained in farmer organization development	11	63	177	260	408	525	1348	848	1933
Number of farmer clubs formed	11	125	159	510	408	1400	1348	2035	1915
Number of farmer clubs with capacity development plans	11	125	159	510	408	1050	1348	1685	1915

Table 24: Number of farmers who obtained NBS Bank farm loans in Mchinji, Kasungu and Dowa Districts

EPA/District/Partner Organization	**Total farmers**	**Farmers who obtained NBS Bank farm input loans**			
		Total	Men	Women	% Women
Mlonyeni (Mchinji)	3,250	1,345	741	604	45
Kalulu (Mchinji)	2,152	365	241	124	34
Mkanda (Mchinji)	1,914	319	191	108	34
Msitu (Mchinji)	2,263	200	146	54	27
Mikundi (Mchinji)	986	97	59	38	39
Chioshya (Mchinji)	759	199	139	60	30
Santhe (Kasungu)	5,114	531	250	281	53
Dowa	721	160	88	72	45
FARMERS DIRECTLY UNDER CHDI SUPERVISION	17,169	3,216	1,855	1,341	42

Source: CHDI Progress Report (June, 2013)

7.4 Case Studies and Success Stories

CASE STUDY

Mr. Abednego Kiwia (AGRA, Nairobi) visited the CDI anchor farm project on 7 May 2013. In the pictures below, on the left Abed paid a courtesy call to a rapidly rising rural entrepreneur, Mr. Amos Chipokosa, who started his entrepreneurship with Soybean growing in 2008. He got his initial capital from the sales of Soybean and used the revenue to re-invest in groundnuts and maize production for sale. And further invested in retail business. He recently bought two commercial plots – one at Ludzi Mission and another at Matutu trading center, both in Mchinji District. He plans to build a house for rental at Ludzi mission and a wholesale shop at Matutu.

*Picture 1: **Mr.** Amo, Chipokosa (on the right), and a budding young rural entrepreneur who sprang from Soybean farming business*

The person on the right is Abed Kiwia of AGRA

Soya bolsters up a budding rural entrepreneur in Mchinji, Malawi
1 May 1, 2012

A young farmer, Amos Chipokosa, of Kapalamula Village, Chief Nyoka, in Mchinj District in Malawi is an example of a fast-growing rural entrepreneur. Born on 28 December 1982 and attained O'Levels in 2006, the young entrepreneur is married to Sofilet Banda. His spouse was born on 12 Dec 1985 and also attained O'Levels in 2007. They got married on 28 November 2008. They are blessed with a baby girl, Linley, born on 27 October 2009.

When they were growing up, Amos and Sofilet had different visions of life. Having been brought up in a catholic community, Amos wanted to be a priest. After finishing school, his vision changed to owning a successful business. His ambition is to grow the current grocery store business, whose current value is estimated at MK500,000 (US$3,000) into a thriving

wholesale business.

On the other hand, Sofilet wanted to become a school teacher. She still harbors the ambition of becoming a teacher up to now. "I am where I am because education opened my mind. So I really wanted to be part of a team that opens other people's minds so that they can prosper in life", she observes.

Amos and Sofilet run a grocery store, which started in December 2008. This business idea came from Sofilet. "When I was living in Mponela in Dowa District, our neighbor had a grocery store and the wife used to operate the store. I observed that the family lived a decent life and easily met their day to day needs due to regular cash flow", Sofilet narrates. "It is a business which both husband and wife can operate", she adds. Amos's initial reaction to Sofilet's business idea was a series of questions. Sofielt recounts: "He asked me several questions: what are the benefits of this business? What are the problems we will encounter? How much start-up capital do we need?" Luckily, Amos allowed the business idea to get onto the road but he backed out saying he wanted to observe how the business starts up. Sofilet started the grocery store with MK15, 000 (about US$110 at the time). Of this, MK10, 000 was sales of groundnuts and she borrowed MK5, 000 from her brother.

In 2009, Amos decided to boost the business by injecting a working capital of MK15, 000. These were earnings from soya sales. He grew 1 acre (0.4ha) of soya beans by joining Tiyanjane farmers club under the Clinton Development Initiative anchor farm business development project in 2008/09 season. He harvested 7 bags of soya beans (about 350kgs). He managed to pay off the farm input loan of MK22, 000 and had a profit of MK15, 000. He invested all this profit into the grocery store business. The family continued growing soya in the following year, 2009/10 season. They grew 1 acre soya financed by family savings and harvested 8 bags (400kgs). They had a profit of MK27,000 and recall that prices were depressed (MK40/kg as opposed to MK85/kg in 2009).

Their business model is characterized by a symbiotic or "cross" financing strategy. Thus proceeds from crop farming are injected into the grocery store business and earnings from this business are used for covering crop production costs. For instance in 2010/2011 cropping season, they grew: 3 acres of maize (and harvested 10.5 ox-carts, equivalent to 425kgs of maize grain); 0.5 acres soya beans (harvested 100kgs); 2 acres groundnuts (harvested 60 pails unshelled nuts equivalent to 300kgs shelled nuts); and 1 acre tobacco (harvested 5 bales x 100kg each). The grocery store covered production expenses in the sum of MK106,000 (about $650) broken down as follows: hybrid maize seed MK8,400; 10 bags of fertilizer MK65,000; hired labor MK33,000.

Over and above these production expenses, the young family invested in a backyard livestock enterprise. They bought 5 pigs when they were piglets at MK2,000 each and 1 goat at MK4,500 in 2011. Amos retorts: "Livestock is very useful during emergencies. It is handy for input purchase – you just sell some of the stock and you buy farm inputs just like that! We also keep livestock for festivities".

Amos watering his pigs

This was not all the expenses the business financed in 2011. They also paid school fees for Amos sister who is at a secondary school at Kochilira in Mchinji. In 2011 she was operating from home as a day scholar. Her fees and out of pocket money was MK15,000. Amos and Sofilet bought a business piece of land at Matutu trading center within Mchinji District at MK30,000. His plan is to build a house by next year for commercial rental business. A year before last, in 2010. The couple rented 2 acres of land (bringing the total landholding to 6.5 acres) for two years at MK14,000. In the same year they invested about MK70,000 in improving their house. It is indeed a decent home as seen in the picture.

Asked on why under the same environment many other people fail to prosper, Sofilet had this to say: "To me, the key is education. A lot of people have tried to open businesses but they do not go far because they are unable to determine whether they are making a loss or profit. In addition, lack of frank discussions between husband and wife lead to inability to generate and implement good business ideas". Amos added that most people like consumption expenditure hence their businesses don't grow. For those who are in matrilineal family system, there is no incentive to invest as once there is a family conflict the man can be chased away from the wife's home", Amos added, over a laughter.

Interview taken on: 27 April 2012
Interview and story-writing by: Austin Ngwira, CDI/Malawi

7.5 **Site Specific and limiting fertilizer recommendations**

Table 25: Site Specific and limiting fertilizer recommendations for Estate 68

Client Details	Name	NGWIRA CLINGTON FOUNDATION
	Farm	ESTATE 68
	District	MCHINJI
	Email	no email
	Tel	0
	Rep	LOCKINGTON
	Date	1ST AUG, 2013

Nutrient Recommendation Guide

Field	Crop		Target yield t/ha	Area ha	N k/ha	Total P2O5 kg/ha	Total K2O kg/ha	Kg of nutrient required to make soil up to ideal levels for soil type							
								Total MgO kg/ha	S kg/ha	B kg/ha	Zn kg/ha	Fe kg/ha	Cu kg/ha	Mn kg/ha	Mo g/ha
1	Soya	Plant	3.00		20	41	47.00	95	87	2.1	8.8	1.7	1.3	12.4	80.0
2	Soya	Plant	3.00		20	41	41.00	100	81	2.1	9.0	1.7	1.4	12.3	80.0
3	Soya	Plant	3.00		20	41	41.00	98	77	1.8	9.3	1.0	1.3	10.8	80.0
4	Soya	Plant	3.00		20	41	41.00	86	78	1.9	9.1	1.2	1.1	9.7	80.0
5	Soya	Plant	3.00		20	60	36.00	61	72	1.7	9.1	1.1	-1.2	11.2	80.0
6A	Soya	Plant	3.00		20	41	41.00	107	85	2.1	8.9	0.4	1.4	8.9	80.0
6B	Soya	Plant	3.00		20	60	47.00	105	90	2.2	9.8	2.2	1.5	12.2	80.0
7A	Soya	Plant	3.00		20	41	47.00	106	85	2.1	9.1	-0.6	1.4	12.5	80.0
7B	Soya	Plant	3.00		20	41	41.00	62	86	2.1	9.2	2.1	1.2	-1.7	80.0
BLUEGUM FIELD	Soya	Plant	3.00		20	64	41.00	73	75	2.1	9.4	1.5	-0.1	9.9	80.0
Means					20	47	42	89	82	2	9	1	1	10	80

Table 26: Site specific and limiting fertilizer recommendations for Kandaula Farm

Client Details	Name	NGWIRA CLINGTON
	Farm	KANDAULA
	District	MCHINJI
	Email	no email
	Tel	0
	Rep	LOCKINGTON 7TH
	Date	AUG,2013

Nutrient Recommendation Guide

Field	Crop		Target yield t/ha	Area ha	N k/ha	Total P2O5 kg/ha	Total K2O kg/ha	Total MgO kg/ha	Kg of nutrient required to make soil up to ideal levels for soil type. S kg/ha	B kg/ha	Zn kg/ha	Fe kg/ha	Cu kg/ha	Mn kg/ha	Mo g/ha
G/NUTS FIELD	Soya	plant	3.00		20	71	36.00	43	74	1.9	8.7	2.5	0.5	12.6	80.0
COMPOUND SOYA	Soya	plant	3.00		20	103	55.00	-34	82	2.3	11.4	4.4	0.2	10.8	80.0
COMPOUND FARROW	Soya	plant	3.00		20	80	77.00	92	88	2.7	11.5	3.4	0.8	11.1	80.0
1	Soya	plant	3.00		20	80	67.00	50	57	1.9	9.2	2.7	0.5	9.9	80.0
KANDAULA	Soya	plant	3.00		20	103	97.00	19	75	2.2	9.7	2.7	0.5	11.7	80.0
Means					20	87	66	34	75	2	10	3	1	11	80

Table 27: Site Specific and Limiting Fertilizer Recommendations for Mpherero Farm

Client Details	Name	GWIRA CLINGTON FOUNDATION
	Farm	MPHERERO
	District	MCHINJI
	Email	no email
	Tel	0
	Rep	LOCKINGTON I
	Date	1ST AUG, 2013

Nutrient Recommendation Guide

Field	Crop		Target yield t/ha	Area ha	N k/ha	Total P2O5 kg/ha	Total K2O kg/ha	Total MgO kg/ha	Kg of nutrient required to make soil up to ideal levels for soil type. S kg/ha	B kg/ha	Zn kg/ha	Fe kg/ha	Cu kg/ha	Mn kg/ha	Mo g/ha
1A	Soya	Plant	3.00		20	80	82.00	89	51	2.2	9.8	2.0	1.1	16.7	80.0
1B	Soya	Plant	3.00		20	103	72.00	107	36	2.2	9.8	2.5	1.1	17.3	80.0
1C	Soya	Plant	3.00		20	80	82.00	66	62	2.2	9.8	2.1	1.1	14.0	80.0
19	Soya	Plant	3.00		20	80	82.00	88	60	2.2	9.8	2.4	1.1	15.0	80.0
2	Soya	Plant	3.00		20	103	77.00	103	53	2.2	9.8	2.5	1.1	17.2	80.0
3	Soya	Plant	3.00		20	103	112.00	93	81	2.1	9.4	2.1	1.2	16.7	80.0
4A	Soya	Plant	3.00		20	103	97.00	97	62	2.0	9.5	1.9	1.1	15.4	80.0
4B	Soya	Plant	3.00		20	80	102.00	113	57	2.1	9.7	2.1	1.2	17.8	80.0
4C	Soya	Plant	3.00		20	103	92.00	112	68	2.0	9.4	2.2	1.1	18.0	80.0

5	Soya	Plant	3.00		20	103	72.00	94	59	2.2	9.8	2.2	1.1	17.8	80.0
6 HACTOR	Soya	Plant	3.00		20	103	82.00	104	64	2.2	9.6	2.2	1.2	17.7	80.0
6A	Soya	Plant	3.00		20	80	87.00	84	77	2.2	9.7	1.6	1.2	14.7	80.0
6B	Soya	Plant	3.00		20	80	87.00	96	68	2.0	9.7	2.2	1.2	16.0	80.0
7	Soya	Plant	3.00		20	103	102.00	88	52	2.1	9.6	1.8	1.2	15.2	80.0
23A	Soya	Plant	3.00		20	103	72.00	91	73	2.2	9.8	2.3	1.1	16.6	80.0
23B	Soya	Plant	3.00		20	103	102.00	86	74	2.2	9.8	2.7	1.2	16.8	80.0
34	Soya	Plant	3.00		20	50	66.00	90	84	2.7	11.0	3.2	1.6	13.7	80.0
BLUEGUM	Soya	Plant	3.00		20	103	102.00	69	52	2.1	9.5	2.2	1.1	15.4	80.0
COMPOUND BLOCK	Soya	Plant	3.00		20	103	77.00	85	70	2.2	9.6	2.6	1.0	16.1	80.0
ELIZA 1	Soya	Plant	3.00		20	103	112.00	63	82	2.2	9.8	2.8	1.1	16.4	80.0
ELIZA 2	Soya	Plant	3.00		20	103	67.00	71	77	2.2	9.8	3.0	1.0	15.4	80.0
KACHAMBA	Soya	Plant	3.00		20	138	97.00	122	87	2.2	9.8	-4.0	1.1	17.7	80.0
KAPULUKUTA	Soya	Plant	3.00		20	103	112.00	49	70	2.2	9.8	3.0	1.2	15.6	80.0
KASENGELE	Soya	Plant	3.00		20	138	87.00	121	84	2.2	9.8	2.0	1.2	16.6	80.0
MARIA	Soya	Plant	3.00		20	103	112.00	78	81	2.2	9.8	2.8	1.1	17.6	80.0
MITHETHE	Soya	Plant	3.00		20	103	82.00	104	74	2.1	9.5	2.8	1.2	15.7	80.0
MPONDA	Soya	Plant	3.00		20	138	112.00	52	77	2.2	9.3	3.1	1.4	16.1	80.0
Means					20	100	90	89	68	2	10	2	1	16	80

7.6 Terms of Reference for the Rapid Assessment

The Rapid Assessment addressed eight objectives as follows:

i. Assess the project structure and delivery mechanisms and determine whether or not they are adequate to realize the intended objectives;
ii. Determine to what extent the project implementation processes have delivered the planned outputs, and whether these are beginning to realize the expected outcomes;
iii. Capture the opinions of the project key stakeholders on the design, implementation structure and what went well, or not so well, in the project management;
iv. Identify critical factors (e.g. improving extension services through the combined use of Government extension workers and lead farmers; developing structured access to markets; engagement with farmer organizations; technology demonstrations; seed companies; among others) that may have supported or impeded the project in realizing its expected outcomes;
v. Assess and document lessons learnt in the course of project implementation, and highlight success stories from the project beneficiaries;
vi. Assess the efficacy of the different models utilized by the project, for instance, in scaling-up integrated soil fertility management practices, financing mechanisms for farmers to access inputs (particularly improved soybean seeds and fertilizers), and the marketing support initiatives;
vii. Assess influence of the project on policies and investments by the Government. Determine whether the CDI model is scalable at national level.
viii. Identify key challenges and gaps that may affect the attainment of the project objective and recommend actionable interventions that should be taken to improve the situation in the current, or future similar projects funded by AGRA.