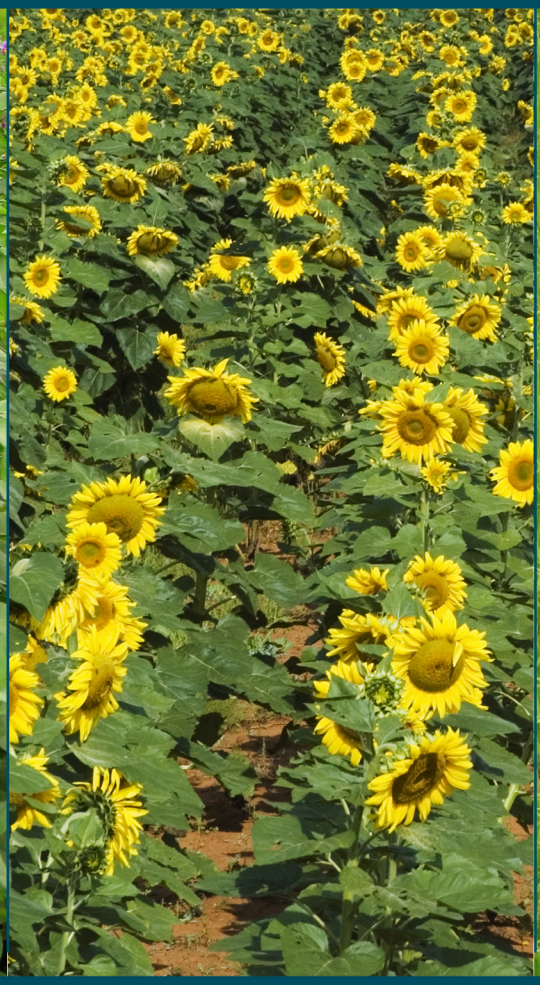
CATALIST-Uganda

Mid-term review



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Mid-term Review of the IFDC CATALIST-Uganda Project

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Executive summary

CATALIST-Uganda aims to sustainably commercialize smallholder agriculture through improved productivity and market development. Marketable surpluses resulting from the programme will both raise farm incomes in Uganda, and increase regional food security for the wider East Africa and Great Lakes Region. The four-year CATALIST-Uganda project is funded by the Netherlands Ministry of Foreign Affairs through the Embassy of the Kingdom of the Netherlands (EKN) and began on July 1, 2012.

In early 2015 a mid-term review (MTR) of the programme was carried out by Roger Bymolt, Senior Advisor at the Royal Tropical Institute (KIT), in order to assess the current state of the project and its future outlook. The MTR focused on three main crop commodities: Irish potato in the south-western region, rice in the eastern region and sunflower in the northern region. The MTR employed a mixed-methods approach comprising 665 surveys, 15 focus group discussions and 26 key informant interviews with value chain actors, with the intention to not only measure progress but to gain insights into how and why changes have occurred to the extent they have done.

The MTR found the project to be achieving measurable impact against most of its indictors in the south-western potato and eastern rice regions and is on a good trajectory towards sustainability there. Farmers are correctly applying at least two elements of commercially sustainable farming practices, particularly row planting and spacing, and are increasing their use of inputs (especially for potatoes and rice) leading to better crop establishment, weed control and pest and disease control, and ultimately higher yields and profits. Long term change is however dependent on the level of support beneficiary farmers will continue to receive in the final year and a half of the project. Many respondents in the research sample have only received support for one year thus far. However progress is not as evident in the northern sunflower region partly due to a more challenging post-conflict context, higher relative levels of poverty making farm investments more difficult, and poorer road infrastructure contributing to challenges with marketing and input provision.

The increase in chemical input usage in potato and rice areas shows that farmers will make investments if they are given quality training and see the benefits for themselves by directly working on demonstration plots. If they can raise funds to invest farmers will purchase inputs, provided there is reasonable availability from agro dealers near their community. The failure of most sunflower farmers to take up chemical input use partly reflects the targeting of the programme as well as the poverty profile of the area. Many sunflower farmers are too disconnected from markets providing inputs, and many lack the resources to make basic investments in their farms. CATALIST-Uganda needs to take care in selecting smallholder groups as not all farmers are able to make the step to farming as a business – even with CATALIST-Uganda support.

Potato seed is a major challenge. Diseased and deteriorated seed stock is a threat to the sector, greatly affecting yields. CATALIST-Uganda is working with KAZADI and the private sector on this issue, but multiplication at scale will also require smallholders to be trained in the production of high quality seed potatoes. Adulterated inputs are widespread in the programme areas (and throughout Uganda)

and disincentivise farmers from using inputs because either they do not perform as expected (contributing to on-farm losses) or are simply a waste of time and money to source.

Farmer groups are functioning well and most farmer clusters are building their experiences, particularly with group marketing. However, the higher level ABCs are not functioning as envisaged. Since the agri-business cluster structure is integral to the CATALIST-Uganda model much more attention is required in the final year and a half of the programme. Value chain linkages are key to sustainability. Nevertheless, CATALIST-Uganda has had many small wins brokering bilateral relationships between chain actors.

On the marketing side, CATALIST-Uganda has taken generally a pragmatic approach to working with market actors as they have found them. This has meant working with 'best-bet' market actors active in the respective areas, be they traders, small processors, or large offtakers. One major constraint to group marketing is a lack of appropriate storage for farmer groups and clusters to bulk together. This challenge was highlighted in every region, and perhaps illustrates the fact that group marketing is a new experience for most farmers. Those farmer groups fortunate enough to have existing stores nearby were found to be applying the marketing knowledge gained in the programme well and engaging in group marketing efforts. However, those without stores have found it difficult to coordinate group bulking, as without a common store to check produce into, farmers tend not to commit to the group and side-sell individually as before.

The grant activities reviewed were all judged to be excellent choices in terms of supporting the objectives of the CATALIST-Uganda and were found to be adding value to the project. There have been a wide variety of grants (and co-investments) including for feeder roads, processors, research institutes, and seed multipliers.

Gender has been mainstreamed throughout CATALIST-Uganda and the results are positive in terms of numbers of women in the programme and in leadership positions, as well as more structural changes in communities and households, particularly around decision making on crop planning, marketing, and decision making on the use of money received from the sale of produce.

Village Savings and Loans Associations (VSLAs) have been of tremendous benefit in developing farmer's financial literacy and providing them with a basic savings and loans facility. An interesting spinoff effect was found from the VSLAs – they are actually the reason behind farmers meeting on a weekly basis, and while the primary function is savings and loans, they have an effect on reinforcing group cohesion, especially between seasons.

There are some concerns around some of the project targets. The doubling of yields and incomes for 110,000 farmers is an extremely ambitious target. It is rare for any project to achieve a doubling of yields and incomes within such a short timeframe. Furthermore, 110,000 farmers is a very large target considering the necessary quality and depth of support required for each beneficiary farmer. While impressive gains have been made in yield increases for potatoes and rice, overall the target of 110,000 beneficiary farmers is not likely to be met. At present it is believed that in the region of 65,000 direct beneficiaries will be reached. However many more farmers also benefit indirectly from the project's

activities including improvements on roads, irrigation systems, processors, quality input and seed linkages and market access.

IFDC staff were found to be engaged and committed to the project, although all felt that resource constraints were preventing them from achieving more. This was attributed to rules on overhead spending, which has left staff numbers relatively low at both country and regional offices considering the complexity and multi-faceted nature of the project. Implementing partners also frequently expressed time and resource pressures beyond what they say is common for other projects. This has been recognised by IFDC and changes are being made.

Overall, CATALIST-Uganda has made some considerable strides towards achieving its goals. The challenge now is to make a few strategic adjustments to maximise impact and achieve long-term sustainable change.

Introduction

CATALIST-Uganda aims to sustainably commercialize smallholder agriculture through improved productivity and market development. Marketable surpluses resulting from the programme will both raise farm incomes in Uganda, and increase regional food security for the wider East Africa and Great Lakes Region. The four-year CATALIST-Uganda project is funded by the Netherlands Ministry of Foreign Affairs through the Embassy of the Kingdom of the Netherlands (EKN) and began on July 1, 2012. Background information about CATALIST-Uganda and the programme's approach is available at http://ifdc.org/catalist-uganda/.

The following report presents findings from the mid-term review (MTR) process carried out by Roger Bymolt, Senior Advisor at the Royal Tropical Institute (KIT) in March and April 2015. The objectives of the proposed mid-term review were:

1) Assess the 'current state,' of the project: the effectiveness of the project to date and its achievement levels against the targets initially proposed in the project document. (These are provided in the Indicator Performance Tracking Table which is contained in separate file marked Annex 1).

2) Consider the 'future state,' of the project including assessing if the current project goals are feasible and/or relevant. Additionally consider proposed revisions by the project to its current implementation methodology and outcome targets.

The MTR focused on three main crop commodities with which the programme works intensively: potato in the south-western region, rice in the eastern region and sunflower in the northern region. The MTR report directly responds to all of the research questions put to the reviewer by IFDC and EKN in the terms of reference (ToR) and is supported by detailed data available in Annex.

Methodology

The MTR employed a mixed-methods approach involving surveys, focus group discussions and key informant interviews. Mixed-methods was deemed the most suitable approach due to the wide range of research questions and the need to not only gather statistical data measuring what changed, but also to be able to explain why and how changes occurred to the extent they did. The fieldwork period took place between mid-March and mid-April 2015. The fieldwork period included inception meetings with IFDC, tool design and approval from IFDC, enumerator training, tool testing, fieldwork in three regions of Uganda, and a validation workshop.

Research team

The research team consisted of one lead reviewer (Roger Bymolt from KIT), a local consultant (Magala Henry, lecturer at Makerere University), and ten experienced enumerators familiar with local languages. The lead reviewer conducted all focus group discussions (with translation) and key informant interviews, while the enumerator team carried out the quantitative surveys.

Research methods and tools

Literature review

Prior to research tools being developed, all available literature provided by IFDC was reviewed including baseline reports, annual reports, indicator performance tracking table (IPTT) and newsletters. This information helped to inform the initial research tool development, which was validated through inception meetings with IFDC.

Inception meetings

Two inception meetings were held with IFDC headquarters in Kampala prior to the research team heading into the field. The primary purpose of these meetings were to confirm the MTR objectives, understanding of the programme, research logics and reach agreement on the tools. It was also the first of several opportunities to interview senior IFDC staff about their perspectives on the programme's progress thus far.

Farmer surveys

The research target was 200 surveys in each region to ensure a sufficient sample size for statistically significant effects to be observed, within the available budget. This was achieved by the research team (Table 1). Surveys were carried out using digital tablets running the open source software Open Data Kit (ODK).

Table 1 Survey sample, number of respondents per district, region and crop type

District	South-west, Irish potatoes	East, Paddy rice	North, Sunflowers
Kabale	120		
Kisoro	90		
Tororo		37	
Butaleja		204	
Alebtong			92
Lira			122
Total	**210**	**241**	**214**

Care was taken collecting data on input costs and labour days per acre, which many projects struggle with and often under-estimate. Errors were eliminated by using digital tablets (avoiding transcribing) with 'live' calculations (alerting enumerators to input errors, or responses outside a realistic range). This data was also triangulated with a participatory budgeting exercise in the focus group discussions. Furthermore, data which fell outside of 3 standard deviations from the mean was excluded, which removed about 3% of data outliers. This ensures that means are not unduly distorted by a few extreme observations. The reviewer is thus confident in the accuracy of the MTR data.

Focus group discussions

A structured qualitative focus group discussion tool was developed to complement the survey tool. The emphasis was on understanding processes of change, and why respondents hold the views they do. PADev tools (www.padev.nl) were customised in order to structure the qualitative data collection process. The focus was on the activities that have taken place in the project, how they are perceived by beneficiaries, and the extent to which changes can be attributed to the project. The focus group discussions also addressed many of over-arching research questions. The exercises included were:

- Project recall – understanding the roles of other actors working on other related projects and how these influence the context the project operates in
- Changes – Understanding changes in various key aspects related to the project, the reasons and effects of these changes. Gender is given particular focus here.
- Challenges – understanding farmers' challenges for each project crop and ranking these
- Participatory farm budgets – participatory discussion on farm budgets included documenting all labour and input costs per acre on average, average yields, prices, revenues and income per crop. This data includes clear descriptions of how farmers are actually practicing their farming and why some activities take the number of days they do. This data also helps to verify the survey data on input costs, labour days, yields, revenues and profits.

Each focus group discussion took 3-4 hours and involved around 25 farmers in total (but not at one time since farmers are rotated in and out of the focus group discussions to have individual surveys also). Around 10-15 farmers were engaged in focus group discussions at any one time. About five focus group discussions were completed in each research area and this has been compiled into a

database that IFDC can use and refer back to. In total, more than 300 farmers contributed their views in focus group discussions.

Key informant interviews

Key informant interviews were held with all relevant project stakeholders both in Kampala and in each of the regions. Key informant interviews were semi-structured, but designed to answer the overarching research questions, as well as being open enough for interviewees to add anything they thought to be particularly relevant to understanding the programme. IFDC assisted the lead reviewer in the identification of these key informants, but it was the lead reviewer who made the final decision on who should be interviewed, in order to get a good spread of different value chain actors (also referred to as ABC actors). 24 interviews were conducted in the regions and several more at IFDC headquarters (Table 2).

Table 2 Interviews conducted for the MTR

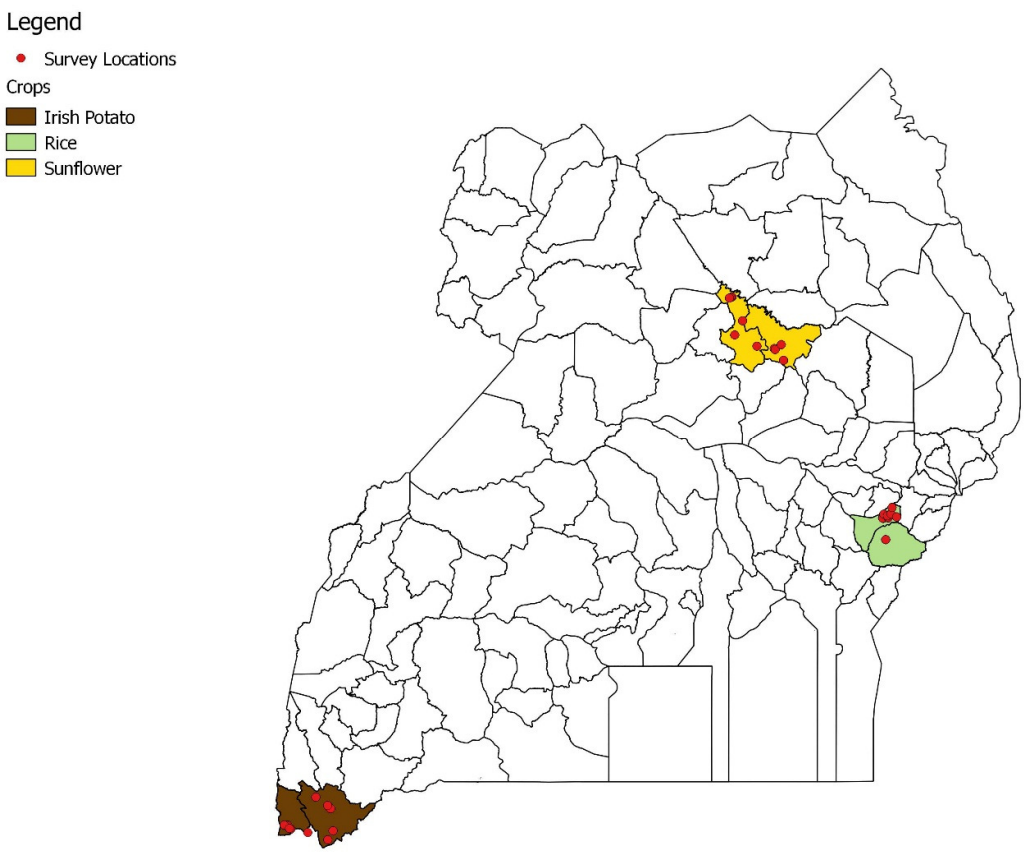
IFDC Headquarters	South-western (potato)	Eastern (rice)	Northern (sunflower)
Chief of Party	Regional Coordinator (IFDC)	Regional Coordinator (IFDC)	Regional Coordinator (IFDC)
Deputy Chief of Party	Excel Hort consult (ABC coach)	District production officer (local govt.)	All Nations Christian Care (implementing partner)
Monitoring and Evaluation Advisor	IIRR (project partner)	EPSEDEC (project partner)	Share consultants (project partner)
(All other staff during validation workshop)	5 Talents (Microfinance)	Eastern Rice (miller)	NYEKO RAC (cooperative)
	Postbank (finance)	Small miller (Elgon rice millers)	DFCU (Finance)
	Input supplier shop	Input supplier shop (Ramah Agro Inputs)	Ajar Agro (small processor)
	KAZADI (research institute)	Postbank (finance)	Mt Meru (large processor)
	Chairman traders association (traders)	Tororo cluster leadership (Nagongera)	Input supplier shop (Harvest Agro)
3+	8	8	8

Research area and sampling frame

The MTR research was carried out in two districts per region (Figure 1). The criteria for inclusion was that CATALIST-Uganda should have worked with the farmer group for at least 2 seasons. IFDC provided a list of farmer groups from which the reviewer selected a random sample. Every third (or sometimes every fourth) farmer group on the list was sampled.

All farmers from each farmer group met with the research team in an area that was convenient to them. At that central place (often the place where farmers engaged in regular VSLA activities) all farmers from the farmer group were surveyed by an enumerator. When farmers were not being surveyed they were participating in a focus group discussion with the lead reviewer. The process of surveying and conducting a focus group with each farmer group took 3-4 hours. The evaluation team engaged two farmer groups per day in order to meet the target number of surveys.

Figure 1 Map of surveyed districts and locations



Research questions

The following section responds directly the over-arching research questions put to the reviewer by IFDC and EKN. It is divided into six sections: Production Push, Agricultural Economics, Market Pull, Cross Cutting Themes, Operational Capacity, and Proposed Future Strategies. Responses to each section are based on both qualitative and quantitative data, and this data is referenced to tables in the Annex.

Production Push

Are participating farmers (female/male) using recommended quality inputs (certified seed/planting material, fertilizers and/or herbicides)?

The use of chemical inputs (fertilizers, herbicides, pesticides, fungicides) has increased considerably among participating farmers – both in terms of the numbers of farmers using them, and the amount of inputs used. This is particularly true for the southwest (potatoes) and east (rice), whereas north (sunflower) has struggled to increase fertilizer and pesticide mainly due to an expressed lack of availability. These findings are confirmed by both survey data and focus group discussions.

Table 3 Use of farm inputs by participating farmers

	Potatoes (South-West)	Rice (Eastern)	Sunflower (Northern)
Planting Fertilizer	88% (26%)	63% (24%)	10% (6%)
Pesticides	70% (51%)	86% (24%)	7% (6%)
Herbicides	41% (34%)	43% (17%)	26% (1%)
Fungicides	67% (n/a)	36% (n/a)	0% (n/a)
Seed purchased	67% (52%)	74% (42%)	93% (68%)

Note: The observed percent use in the MTR is reported first, with the baseline percent given in brackets

What are (if any) the inhibitors to farmers adopting this technology?

The main inhibitors are access, cost, and ability/willingness to make the necessary investments.

In the **southwest (potatoes)**, focus group respondents noted that before CATALIST-Uganda there was a low awareness of the benefits of fertilizers. They elaborated that although many people knew about fertilizers, they had only heard about them and not seen them demonstrated or used by neighbouring farmers. They also lacked knowledge in how to apply these properly, or in the correct quantities. The demonstration plots and accompanying trainings were expressed by farmers as having been fundamental to farmers testing fertilizers and other inputs, seeing the results, and then adopting them. Cost is also being brought down in some villages through bulk buying in groups, however this is just beginning. CATALIST-Uganda has certainly helped to bring down many of the barriers to

farmers committing to an investment in fertilizer and other inputs. A similar description of this change pathway was made by potato farmers with regards to other chemical inputs.

However, lack of availability of spray pumps was cited as a serious challenge (Table 24). As more farmers are using pesticides there has come to be insufficient supply to meet demand for timing spraying application, leading some to spray late and others just to give up. The biggest issues with regards to potatoes is access to quality seed (Table 24). This was stated consistently as the biggest challenge farmers face. Existing stock is diseased or has deteriorated, affecting yields. Available supply of clean seed stock in Uganda is well short of demand. This is a serious issue because it is a major item in the farm budget for potato farmers (more than all other input costs combined) and because it is a major variable on yields. CATALIST-Uganda is on the right track by recognising this and investing in KAZADI[1] to clean some varieties (Rwangume, Victoria, Kinigi), as well as investments in screen houses (most of which are yet to come online).

For **paddy rice in the eastern region,** diseases continue to be a problem, necessitating the use of chemical inputs. While work has begun on the IFDC side to better link farmers with input suppliers, quality was regularly cited as a major issue. Adulterated products are widespread in the programmes areas (and throughout Uganda) and disincentivise farmers from using inputs because either they do not perform as expected (contributing to on-farm losses) or are simply a waste of time and money to source. IFDC has helped the situation by trying to find honest suppliers that they can recommend to farmers in Mbale. Only one such supplier has been able to be identified thus far, highlighting how rife the marketing of adulterated inputs is. To be sure, much more needs to be done in this regard and the challenge is bigger than IFDC can address through CATALIST.

Group buying can help keep costs reasonable (including transport costs, which is expressed as a major issue among respondents far from town), however group buying activities need ongoing support and group cooperation is a new thing for most CATALIST-Uganda farmers.

There has been a major uptake of Wita 9 (purple) among beneficiary farmers. A point on Wita 9 is that the original grains were known to be slightly brownish after milling which was less desirable to the market. Wita 9 purple is well accepted among the respondents spoken with, and was spoken of favourably among the mills that knew of it (not all did).

It should be noted however that farmers consider other challenges to be more urgent than the uptake of improved inputs. (This may be because farmers feel that the input situation has now significantly changed through the programme). The bigger challenges that rice farmers cite are irrigation, with water control being a major issue, as well as road accessibility to get their crop to the mills and markets (Table 39).

In the **sunflower growing areas of the northern region** chemical inputs were taken up at a much lower rate than in other CATALIST-Uganda areas. While most participants could clearly articulate the advantages of using inputs having seen the effect in demonstration plots, some said that they need

[1] (KAZADI) Kachwekano Zonal Agricultural Research & Development Institute, institute of National Agriculture Research Organisation (NARO)

more training and most had not adopted. To some extent this needs to be taken in context: most had never had agricultural training of any kind before CATALIST, few had ever used inputs before, and the conflict has left the area more impoverished than other areas with farmers having less available income to invest in their farming. This is not an exaggeration, and is supported by survey data on income and food security. Indeed, during focus group discussions around hired labour it was not uncommon to hear from farmers that they paid for hired labour until they ran out of money, after which everyone starts working on a quid pro quo basis. This raises the obvious question of whether CATALIST-Uganda can succeed in its inclusive market development objectives, or whether it should be working with a profile of farmer for whom there is a real possibility of making the required production investments to make the step up.

The other issue for chemical inputs is the remoteness of farmers to input suppliers. Focus group participants frequently said that even if they had the money to invest (many said they didn't), they wouldn't know where to get them except for in Lira. The cost of a return trip to Lira would easily be more than the cost of the inputs themselves for an individual. Since most farmers in a group were still unsure about investing in inputs, group procurement is a challenge.

It is also a challenge for IFDC to improve the inputs availability situation – most inputs come from Lira, and when talking with suppliers in Lira it was clear that there is high demand in the town at present and they expressed that there is no compelling business case for them to go to the countryside even for market days. This leaves the option of enhanced group coordination to buy bulk supplies in Lira. Again, this is easier said than done, but is possible. Groups are nascent, and lack trust and group togetherness, having recently come out of a conflict situation. Many members are still not sure about making the investments ahead of time when household finances are tight.

An interesting point on chemical inputs was that lack of access to herbicides for land clearing was cited as a bigger challenge than fertilizers in the 'challenges' exercises in focus group discussions. The reason for this is that farmers clear more land for sunflower (than in the potato and rice areas) and that farmers recognise the labour saving potential (and the cost savings that come with this) of using non-selective herbicides in clearing land.

This can be seen in the issue of seed availability, which was repeatedly cited as the biggest challenge facing farmers in focus group discussions. Last season (2014) there was a major shortage of seed both from Mukwano and Mt Meru. The main complaint was the price of seed being hiked by Mukwano agents by up to 50%. While this is obviously a large increase, seed is a relatively small production cost compared with other items and labour costs – unless households are only using their own labour with no other inputs because they are cash poor. For cash poor farmers, some reverted to maize as a safe option in season 'B'. The lack of availability of seed was felt across the area. Apparently Mukwano was not able to source as much seed as they had been promised from overseas and Mt Meru have stopped providing seed, having had a bad experience procuring seed for their farmers which failed to germinate. It is difficult to see what IFDC can do about this seed issue, although one idea would be to use their networks to identify the source of the problem. Demand is there, farmers are willing to pay for seed, but seed supply is insufficient (see Table 56).

Is there evidence to suggest that participating farmers (F/M) are applying correctly at least two elements of commercially sustainable farming practices?

There is good evidence that participating farmers, both male and female are correctly applying at least two elements of commercially sustainable farming practices[2]. The breakdown in usage of chemical inputs is discussed above, but in addition many farmers have changed fundamental practices that are resulting in improved yields (see Table 12, Table 27, Table 44). The change with the biggest uptake, resulting directly from training and demonstration plots, is that of row planting and abandoning the practice broadcasting seed. Proper spacing is fundamental to good plant growth for all three crops and was perceived by farmers as the easiest practice to change, with little additional labour cost.

Improved planting practices were very frequently cited among **potato farmers**. Furthermore a high percentage (73%) of farmers are dehaulming their potatoes and leaving them in the ground for 2 weeks before harvesting. 81% say that they now ensure all potato tubers are removed from the soil at harvest time, understanding that this reduces disease buildup in the soil. Crop rotation is also practiced by 93% despite small plots of land. The big majority keep potatoes off the same plot of land for at least 2 seasons before reintroducing again.

This was experienced most strongly by **rice farmers** who could clearly articulate how they have move to seed bed preparation and planting, and such nursery beds were easy to observe in the fields of beneficiary farmers. Rice farmers also benefited massively from improved water control practices. This was supported by IFDC investments in rehabilitating or building new water gates. Improved water control of lowland rice is essential to yields, and has an outsized yield benefit compared with other improved practices.

In addition to row planting, which was now practiced by virtually all **sunflower farmers**, many practiced minimum tillage methods. It was expressed however that there was a lack of rippers for the oxen in the area, including those available for hire. The major challenge for sunflower farmers, as discussed earlier is adoption of improved inputs and access to seed. Many farmer respondents and implementing partners strongly suggested that more than one season of support is required for farmers to grasp to new skills they are being taught. They typically learn about them in the first demonstration season and attempt to adopt them in the second season. However, this backstopping perhaps needs to be more intensive, especially if a farmer is not able to make all the investments in his or her first season adopting. A case in point is chemical preparations. Farmers expressed a lack of confidence in how to mix chemicals, and the reviewer has some doubts that this is being done safely. This is all the more important since the World Health Organisation has now listed glyphosate as a probable carcinogen[3].

[2] These are: Crop rotation considerations (the choice of what to produce and when); Land preparation; minimum tillage; Plant nutrient requirements, fertilizer kinds, amounts and when to apply; Crop establishment methods; planting density, arrangement; Weed control; Integrated pest and disease control; water management; Harvest methods; On-farm storage methods.

[3] See http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045%2815%2970134-8/abstract (pay walled), also see http://www.nature.com/news/widely-used-herbicide-linked-to-cancer-1.17181

What is the average reported yield per acre of rice, cassava, Irish potatoes, soy bean and sunflower in MT/ha /acre being achieved by participating farmers. How does the reported yield compare to the project baseline and national average?

Potatoes, South-western: There is a 94% increase between MTR and baseline. This is supported by qualitative focus group data on yield per acre. Focus group participants clearly attributed these changes CATALIST-Uganda training, adoption of new practices and increase in adoption of inputs. No other trainings or new projects were reported to have taken place around the same time as CATALIST-Uganda in the surveyed areas. Rainfall quantity and timing was reported by respondents to have been perfectly consistent with average years.

Rice, Eastern: There has been a 146% increase between MTR and baseline, which is again supported by focus group data on yield per acre. Participants attributed changes to CATALIST-Uganda training, adoption of new practices (especially improved water management and transplanting) and an increase in the adoption of inputs. Rainfall quantity and timing was reported by respondents to have been consistent with average years.

North, Sunflower: The has been a 9% decrease in sunflower yields between MTR and baseline. The mean reported yield from survey data is broadly consistent with that of the focus group participatory budgeting data, giving confidence that the MTR yield data is correct. It is interesting that in focus group discussions some participants felt that yield data had improved slightly due to some farmers engaging in improved practices (such as row planting and timely weeding). However many others said that they had only received the training last year for the first time, and since sunflower is only grown in the 'B' season, many have not yet had the chance to implement the training. Other groups who received the training earlier said that there had not been a large adoption of chemical input use, resulting in little change. Others note that the crisis in accessing quality seed last season reduced yields. Rainfall quantity and timing was reported by respondents to have been consistent with average years.

Table 4 Average yield per acre (KGs), potato, rice and sunflower

	MTR	Baseline 2013	2014	National
Potato	5,341	2,753	5400	2,700
Rice	1,597	648	1470	631
Sunflower	366	405	637	400

Table 5 Average yield per hectare (KGs), potato, rice and sunflower

	MTR	Baseline	2014	National
Potato	13,192	6,800	13338	6,669
Rice	3,945	1,601	3630.9	1,559
Sunflower	904	1,000	1573.39	988

Calculated from Table 4 and multiplied by 2.47 to calculate yield per acre to yield per hectare

To what extent is the project responding to the EKN priority area of 'inclusive agricultural transformation'?

The cited goal of CATALIST-Uganda Uganda is to *sustainably commercialize smallholder agriculture through improved productivity and market development, resulting in marketable surpluses that raise farm incomes in Uganda, and increase regional food security for the wider East Africa and Great Lakes Region.* It is this goal, agreed by EKN and IFDC, to which the CATALIST-Uganda programme should be responding.

In saying this, there is good alignment with the concept of 'inclusive agricultural transformation'. The programme is inclusive in terms of gender (around half of all beneficiary farmers are women), and reaches tens of thousands of smallholders directly. Furthermore, the programme is ambitious in its intent to change the broader value chain for the chosen commodities. Value chain change involves changing a *system*, which most other programmes either do not address or have insufficient resources to do so in a meaningful way. CATALIST-Uganda is one of the few that is able to make inroads in changing this system and is doing so in a variety of ways, such as through linkages with financial institutions, quality input suppliers, traders and institutional buyers, and processors. Certainly change has occurred in the chain even in this short time (see responses to questions under Market Pull and Cross cutting themes) and there are some good indications that this change can be *transformative* and sustainable.

However, the word 'inclusive' is becoming increasingly used and mis-used in the development sector. The reviewer would argue that 'inclusive' should not be conflated with 'everyone' or 'every category' of smallholder. Rather, CATALIST-Uganda should be as practically inclusive as possible with regards to a specific target group. CATALIST-Uganda is about *commercializing smallholder agriculture,* yet not all sub-categories of smallholder have the capacity (or willingness) to make the investments required to commercialise and farm as a business. CATALIST-Uganda would be right to target those smallholders who can practically make the step up and graduate to a more business orientated approach to farming, compared with subsistence agriculture[4].

[4] The CATALIST-Uganda programme brochure states that "the project will target those farmers that possess or have access to a certain amount of land and productive assets and therefore can accept a certain level of risk. The project will focus on farmers that have access to markets and market infrastructure such as roads. […] The most vulnerable farmers (those with little or no land holdings or assets) will not directly be targeted by the project's agricultural activities, they will benefit from the project's public works component, which can assist in asset accumulation. See https://ifdcorg.files.wordpress.com/2014/12/cat_uganda_brochure_web.pdf

There is an argument to be made that inclusiveness of all farmers (no matter their capacity) does not align with the programme goals, and to work with low capacity groups would be a misallocation of resources since such farmers would not be able (or willing) to measurably change with the programme support package. Such farmers might benefit more instead from a different approach from a different programme than CATALIST, perhaps focussing on sustainable livelihoods and a focus beyond a single crop.

Targeting did not seem to be a big issue for most potato and rice groups, as big changes were measured between the baseline and MTR. However in the northern (sunflower) region, this issue of targeting and inclusiveness must be addressed by IFDC programme staff. As many farmers have been trained and participated in the demonstration plot as in other areas, yet adoption of many practices remains low. This is largely due to availability/distance to access inputs and their unaffordability for many farmers.

Agricultural Economics

How have average net farm income from rice, cassava, irish potatoes, soy bean and sunflower changed (in UGX)? How have unit costs of production of priority commodities changed? How does this compare with national averages?

Data on costs of production and farm incomes (gross farm income minus production expenses) per acre are presented in detail for each crop in the Annex. Unfortunately changes between MTR and baseline is problematic to compare, mainly because the reviewer believes the baseline did not sufficiently capture all production costs[5]. National averages either do not exist or are unreliable. The average net incomes per acre for each commodity are summarised in the following table, with the full description of all costs (inputs and labour) is available in the Annex.

[5] The reviewer was pleased to find that CATALIST-Uganda has been costing household labour, as many programmes fail to do so, giving a false picture of all the costs (both cash and opportunity costs) built into a smallholder farming system. In saying this, the reviewer believes that after looking at the baseline survey questions that the original baseline has not fully captured all of the labour costs involved in production. The MTR has tried to present the most accurate estimations of real costs possible (including using inbuilt calculations in the tablet based survey tool), rather than repeating some of the shortcomings in the baseline. Input quantities used and input cost data was also unable to be provided by IFDC from the baseline, further complicating a detailed comparison between baseline and MTR.

Table 6 Summary of costs, revenue and profit per acre per season

	Potatoes	Rice	Sunflower
Yield (kgs)	5,341	1,597	366
Value (UGX/kgs)	604		604
Milled		914	
Value Milled (UGX/kgs)		1,722	
Total Revenue (UGX)	3,223,709	1,574,123	221,091
Total input costs	1,112,111	252,199	96,580
Total labour costs	514,367	816,897	226,483
Profit	1,597,231	505,027	-101,972
Return per labour day	22,905.86	8,314.88	1,641.47
Per unit cost of production	304.55	669.49	882.02

Note: This table summarises costs, revenue and profit per acre per season, and farmers typically have two seasons per year

Nevertheless, the reviewer is of the view that average net farm income has markedly increased for beneficiary potato and rice farmers. This is in light of the fact that a) additional inputs have not increased total costs (including labour) by more than 20%, and labour remains the biggest cost by some distance and b) yields have increased by a considerably greater percentage than costs have done.

In the case of sunflower (and soya) farmers the reviewer is of the view that net farm incomes have increased only marginally, if at all. This is in view of the fact that sunflower yields have not increased, and that there is a low level of adoption of quality inputs by sunflower farmers. However, prices for sunflower are said to have almost doubled in the past 4 years as large processors (e.g. Mukwano and Mt Meru) as well as smaller processors are increasingly in competition. Thus there is much potential for improvements in smallholder profits from sunflower if CATALIST-Uganda production practices are taken up by farmers. It is the production side (including access to quality inputs) that is holding back sunflower farmers more than the marketing side, where there is good demand. A final point on sunflower would be that although profitability is low, this has to be put into context: Farmers clearly expressed that sunflower is their best (or least bad) crop option available. Furthermore, in the northern region sunflower has a much lower ratio of hired labour use than the southwest (potato) and eastern (rice) regions. This means that there is less money actually outlaid for production costs and hence more money in the pockets of households each season if one does not calculate the opportunity cost of household labour. So while sunflower is technically a loss making crop (when household labour is properly costed) it is perceived by farmers to be profit making in terms of money in hand. Indeed, northern region farmers feel that sunflower is the only crop that puts substantial money in their hands each year, which speaks to the low profitability of other crop options. This serves to illustrate the rather difficult situation of northern region smallholders. Participatory budgeting exercises were also conducted for soya in the focus group discussions, although soya was not in the large survey. (Farmers typically grow sunflower in the 'B' season and soya in the 'A' season). Soya was not found to be more profitable than sunflower, and was described by farmers as such. The same production constraints hinder soya and sunflower, as well as bigger problems accessing quality seed. Furthermore soya was said to have poorer market outlets than sunflower.

Can changes to costs and to average net farm income be attributed to the project interventions?

Changes in farm income can be attributed to the CATALIST-Uganda project. Participants in focus group discussions were always asked to recall a) for all other agricultural interventions that have come in the past 5 years and b) what the reasons for changes were whilst describing them.

The MTR research found that in the majority of cases CATALIST-Uganda was the only programme working with the farmers in the research sample. Furthermore, farmers consistently attributed changes in their practices and yields to the CATALIST-Uganda programme. There are of course some external variables such as market price changes, however potatoes and rice farmers have not experienced such a big change in prices. The exception is some groups who have just begun to experiment with group marketing and are realising slightly higher prices from this. Again, this can be partially attributed to CATALIST-Uganda as it is the programme which has sensitised farmers to the advantages of group marketing and how to go about it.

With regards to sunflower, as discussed above the project has been unable to generate the same changes across the sample of beneficiary farmers (although there were certainly localised success stories). Changes in sunflower prices should be mostly attributed to competition among buyers, and IFDC would be wise to view even the largest, Mukwano, as a feature of the sunflower market environment and perhaps reconsider how they can modestly support farmer-Mukwano relationships. In the few cases where farmers groups were sufficiently strengthened by CATALIST-Uganda and marketing as group they were able to realise price increases of 10-15% by holding their produce around 2 months after peak harvest, but this depends on the availability of a group store.

Are farmers able to understand concepts such as labour returns per day, cost of production, net profit and put them into practice? Is there any evidence of farmers keeping records that would support this?

Farmers certainly do not apply concepts of labour returns per day in any calculated sense. This is not surprising as smallholder farmers very rarely track household labour days worked in detail (this is true for everywhere the reviewer has worked in East Africa). However, farmers certainly have a basic sense of labour requirements per crop and have a reasonable sense of the profitability of the crop.

Smallholder farmer understanding of costs of production and net profit were ably demonstrated in the participatory budgeting exercise during focus group discussions. Farmers clearly know costs for various inputs, the cost of hired labour per activity, and revenues. Farmer group leaders often brought a log book with them to show during focus group discussions which was a record of costs, revenues and profits derived from the CATALIST-Uganda demonstration plot. However most individual farmers do not have an accurate idea of overall profitability due to a lack of record keeping at the household level. While some keep basic records (e.g. receipts from inputs, or basic yield and price data), a very low percentage actually keep detailed records (see Table 7 below). A lack of record

keeping is a serious problem for smallholder farmers looking to 'farm as a business' throughout East Africa. Perhaps the best suggestion at this stage would be for CATALIST-Uganda to continue to backstop farmer group leaders to keep detailed records season on season, and to share and discuss these farm records with the group to spread knowledge of results from good practices.

Table 7 Frequency of CATALIST-Uganda farmers keeping records

	Irish potato	Paddy rice	Sunflower
No records	28%	50%	57%
Yes basic records	58%	46%	38%
Yes detailed records	14%	4%	5%
Total	209	241	214

Market Pull

Is the current Agri-business cluster structure fit for purpose? Is it the best implementation vehicle for the project agri-business activities?

It is important firstly to note how the agri-business cluster structure is currently arranged in CATALIST-Uganda. Many key informants interviewed had difficulty articulating how the whole structure hangs together, as they only knew parts of it. It became clear through the course of the research that some levels of the agri-business cluster structure are more developed that others. The Agri-business cluster structure is integral to the CATALIST-Uganda model. Many levels of the structure require more attention in the remainder of the programme. On the basis of key informant interviews, the reviewer suggests that the progress at each level is as follows:

Table 8 Reviewer rating of programme progress on ABC levels

	Farmer group	Farmer cluster	Sub-county ABC	District ABC	Mega ABC
South west (Potatoes)	*****	****		**	
East (Paddy rice)	*****	***		*	*
North (sunflower)	*****	***			*

Note: Reviewer perception of progress based on interviews with relevant stakeholders. 'Progress' means intensity of work done thus far by CATALIST-Uganda at each level and present capacity that has been developed.

The farmer group level has been given the most attention and the programme has built up a good level of capacity among farmer groups. This, despite the fact that most pre-existing groups before CATALIST-Uganda only existed in name, or barely did anything tangible as a group beforehand.

The farmer cluster level, which brings together farmer groups, has likewise had a good degree of attention, although more could be invested in the coordination of marketing and input supply activities for some groups. Essentially progress on farmer cluster level appears (based on interviews and focus groups) to be a little uneven, with some clusters forging ahead while others are nascent and are yet to attempt group marketing at cluster level. Progress has been partly dependent on good geographical clustering (farmer groups are close enough to each other to coordinate), that farmer groups are of sufficient capacity to bother coordinating marketing activities, clusters have a common store to bulk produce in, and there is motivated farmer group cluster leadership.

At the higher levels there has been a lack of progress on ABCs and much more needs to be done. The CATALIST-Uganda regional coordinators were quite forthcoming in discussions around the reasons for this, some of which were perfectly valid. Reasons included lack of staffing capacity in the first 2 years, an initial focus on getting the 'production push' moving with the 'market pull' to follow, and a concern for hitting other challenging targets such as 'number of farmers reached by the programme'. Certainly the overall complexity of CATALIST-Uganda has been testing, given that it targets change throughout the chain. In the south-western (potato) region more has been done than in the other regions, but again this needs more attention. However, saying that there has been a lack of progress on the district tier of the ABCs does not tell the full story. CATALIST-Uganda has had many small wins brokering bilateral relationships between chain actors. These include introductions of financial institutions to farmer groups and clusters (particularly south-western and eastern regions), linking clusters with processors (e.g. rice millers), building traders association capacity and linking them with farmer clusters (e.g. Kabale, potatoes), and linking farmer group clusters with reputable input suppliers (all areas). While this might appear fragmented, it has at least been a realistic and moderately successful approach in the first two years of programme implementation. It is now for CATALIST-Uganda to try to formalise some of these structures and relationships between value chain actors in the remaining time available to the programme.

I would argue that agri-business clusters are a good, tried and tested model for the CATALIST-Uganda value chains (there exist various similar versions of the same general model). However, up to now there has been insufficient CATALIST-Uganda resources committed to making the ABCs function at the higher levels. There is no need to get overly theoretical about clusters. In essence agri-business clusters are simply a platform for the main value chain actors to come together and talk about what is important for them, and as a forum to air ideas about how to make certain chain activities more efficient and/or fair. They can help to coordinate certain activities and broker linkages when they have sufficient capacity, but for structural changes to the value chain they almost always lack resources and capacity to be implementers. For this they require ongoing support through government or programmes such as CATALIST.

One issue is how CATALIST-Uganda should proceed with the ABCs given progress thus far. How many ABC levels should the programme focus on? While an argument could be made for all levels (sub county, district, mega) The reviewer would argue that IFDC should have a critical look at the time and resources available to practically make progress which will be sustainable. The following could be considered:

- South western (potatoes): Continue with District ABC as it is the only one functioning (rice and sunflower are not), abandon Mega ABC as time is too short (unless there is seriously motivated interest expressed from high level actors), and *pilot* sub-county clusters in areas where farmer clusters are well coordinated and able to make the step into more formal arrangements. (Suggest not to create many sub-county clusters just for the sake of it).

- Eastern (rice): Investigate the rumour that Africa Rice Initiative programme is working towards launching a similar platform at the district level and whether this is a good alternative to IFDC setting up a parallel structure. As in the southwest, pilot sub-county clusters in areas where farmer clusters are well coordinated and able to make the step into more formal arrangements.

- Northern (sunflower): In sunflower there is an already established multi-stakeholder platform called OSSUP which performs some of the functions of a mega cluster. However, the capacity and effectiveness of this is unknown by the reviewer since none of the interviewees were able to talk about it except IFDC. Thus CATALIST-Uganda could review and consider how to further stimulate OSSUP. It is well understood that Mukwano is the largest actor in the chain at that they are not always willing to engage with OSSUP, and especially CATALIST. Nevertheless, given Mukwano's power in the chain, it makes sense to keep the door open to them and to see where small wins or relationships can be built, despite differences. It is important to get various value chain actors talking, as the reviewer's impression was that there was more mis-information and hearsay in the sunflower chain than elsewhere. Give some serious attention to sub-county ABCs. Sunflower farmers are much more dependent on local linkages than other areas given infrastructure challenges. Sub-country is probably the best level to work at to make the next step in coordinating input supply (especially seeds and fertilizer) as well as marketing linkages with processors.

Currently the project is working predominantly from a producer level working up through the value chain and is seeking potential off takers. Is this the best strategy? What other strategies could be employed?

The reviewer does not think that the project has explicitly worked in this way. Certainly, there was initial focus at the producer level, particularly regarding farmer organisation and production capacity. Nascent linkages were formed between farmer clusters and value chain actors (including with input suppliers, banks and microfinance, processors, traders etc.). However, on the marketing side, CATALIST-Uganda has taken generally a pragmatic approach to working with market actors as they have found them. First and foremost the programme has tried to build and improve on existing linkages (e.g. traders associations in the south-west and small rice millers in the east). Of course, where opportunities for new potential off-takers were found CATALIST-Uganda has explored these (e.g. transporting rice to Eastern rice millers or Upland rice). But off takers (usually considered to be medium-large formal buyers) are not always the best bet for smallholders. An example of this would

be the Kisoro Potato Processing Plant which is still not operating at reasonable capacity and which many actors rightly have doubts about. So the current approach is the right one, and my comment would be to intensify coordination efforts on the marketing side and capacity building of farmer group clusters. A major constraint to group marketing that must be addressed in some form is a lack of appropriate storage for farmer members to bulk together.

A final comment regarding off-takers would be to make some small steps towards Mukwano (north, sunflowers), or at least to keep the door open to them, given that they are such a major feature of the value chain. It is understand that up to now they have expressed a disinterest in IFDC, however reading between the lines it may be wondered if the initial approach was a bit strong (e.g. seeking preferential prices for IFDC suppliers). A different tack could be to approach Mukwano asking for what *they need* from farmers and how IFDC could help with this. Less ambitious opportunities can perhaps be found here. In offering this 'free' help IFDC could later lean on Mukwano to get favourable terms for some of its clusters (e.g. for IFDC farmer group clusters to preferentially access quality seed. Other 'small-step' ideas could well emerge through engagement and subsequent trust building). Nevertheless, given the time remaining in the programme, CATALIST-Uganda should not waste undue resources on this if there remains no sign of Mukwano engagement, but simply keep a basic line of communication open for if and when the context changes.

What other alternative options for agribusiness clusters are available to IFDC, would any of these realistically help achieve 'Objective 2,' of the project?

Options for modifying agri-business cluster structures are described in the above question. At this stage of the programme radical changes to the agribusiness clusters are not recommended, but rather more resources and attention committed to them at certain levels (see above).

Is there scope for realignment of the agribusiness clusters with the Area Cooperative Enterprise (ACE) model?

First, we would need to consider what levels of the agribusiness cluster structure would need to be aligned. There are quite some similarities between the ABC and ACE models - essentially both are about linking lower level farmer groups (or Rural Production Organizations) with higher level farmer group clusters (or Area Cooperative Enterprises) for the purposes of marketing advantages, achieving economies of scale in input provision, and making financial linkages.

It would be a mistake to get overly theoretical about this at this stage in the CATALIST-Uganda programme. The current farmer group → farmer group cluster arrangement is about the right level for most farmers. Groups and clusters are newly formed (even if some existed in name before), they are invigorated, and farmers broadly understand the structures and their roles. Changes at this stage will create unnecessary confusion.

In some few cases the reviewer spoke with higher capacity farmer group clusters who are forming a cooperative. This is great, and a natural graduation – not a model that must be applied. Just as successful can be working with the structures that are already there, such as better linking of nearby rice farmer group clusters with the Doho Rice Scheme Cooperative. In some places, such as in hilly areas of the southwest, geography and poor infrastructure linkages would work against larger scale cooperative models.

In short, if farmer groups and farmer group clusters are not already efficiently group marketing at this level, there is little chance they will invest in higher level structures (ie Area Cooperative Enterprises, or other versions of the same) that are more removed from them. Most farmer groups and farmer group clusters have only just begun doing group marketing, and they need to be given a chance to learn to do this. A bigger challenge than considering new models is ensuring that there are group stores that are accessible to farmers for them to group bulk in.

A final word on higher level cooperatives / Area Cooperative Enterprises is that these would take many years of sustained support to develop the capacity of, and at this point the reviewer does not see either the added value over the ABC model, or the organisation who will support the development of these structures for at least the next 4 years.

To what extent is the project responding to the EKN priority area of 'doing business with the Dutch'?

The project is first and foremost doing a good job responding to the programme objectives, which is to sustainably commercialize smallholder agriculture through improved productivity and market development. On the marketing side IFDC has appeared to take a pragmatic approach of working with market actors as they currently find them, and working to improve conditions (eg quality, delivery coordination, payment terms) between farmers and buyers. As part of this rationale, if Dutch businesses are already operating in the area, the project is ready to work with them. If they are not present then there is likely a reason why (e.g. Dutch investors do not see a sufficient business case to invest). It is not for CATALIST-Uganda to second guess the movements of investors, but rather to respond to market realities, particularly for beneficiary farmers. IFDC has shown that they are very comfortable with both small and large buyers.

There are some examples of working with the Dutch:

1. Kisoro Potato Processing Plant in the Southwest: Not strictly a Dutch investment, however the plant was made possible by contributions from the Netherlands Private Sector Investment Fund (PSI)[6]. This is a new factory, operational only in for two years or so and running well below capacity. When visited by the evaluation team it was not running and management was not available for an interview. However interviews with other actors informed me that the

[6] http://www.busiweek.com/index1.php?Ctp=2&pI=2599&pLv=3&srI=85&spI=464

wrong potato varieties are popularly grown in the area to chip them (they are not long enough, large enough and have too many eyes) causing problems for the factory. Also it can be questioned why the factory is in Kisoro, so far away from its markets, and where refrigeration (including in vehicles) would add to its costs and reduce competitiveness. In short, the Kisoro Potato Processing Plant is not a buyer to reliably orient a marketing strategy around at this time.

2. Dutch potato variety testing: CATALIST-Uganda is supporting KAZADI research centre to test 21 Dutch potato varieties for their potential in the Ugandan context. This is encouraging, and if trials are successful Dutch seed companies may have an export market which can bring further opportunities.

Cross cutting themes

Identify the conflicts in working in the wetland areas and ways to mitigate these problems.

The question of wetland conflicts in the eastern region was sensitively asked about in all focus groups. Only one group (name withheld) in the Kachongo sub-county of Butaleja had experienced conflicts. The story is described in full in the Annex. The case goes back to 1994, and a 'big ma' from Amins time supposedly being granted 180 hectares of prime land. Subsequent governments do not recognise his claim, and the government has tried to sensitise him that the wetlands are for all people. But the man is still fighting for the land through the courts and other underhand means. The government advised him to record all his expenses and file for compensation but apparently he has refused this. The conflict has taken various forms including arrests of villagers, allegedly paying off the villagers lawyer to stop representing them, accusations of 'payments' to keep the case alive in court year on year, as well as bringing in people from the other towns with clubs, pangas and ropes to attack the villagers. Last month there was further intimidation when prisoners were brought to the area to cultivate on the other side of the village and prison guards supervised with guns. The villagers also moved there to head him off from ploughing their lands with some success for now. The villagers are at a loss as to what to suggest to resolve this situation. While outside of the scope of CATALIST, one suggestion would be to assist in the set up a legal fund for the villagers. Clearly they are fighting against money and influence, and the villagers are unable to afford the kind of legal representation that will fight for them and bring closure to this issue.

Identify measures for phasing out the activities in Northern Uganda, including mitigating measures such as finding other financiers for the continuation of work if desirable.

As discussed earlier, rates of adoption of some of the practices in Northern Uganda (sunflower) has lagged behind changes in practices in the South-western and Eastern areas. Phasing out of some of these farmer groups simply means leaving them with a little more knowledge on chemical inputs, and

changes in practices around planting and weeding timing, as well as VSLAs and gender. Beyond the programme commitments already conveyed to CATALIST-Uganda farmers, phasing out doesn't require any special measures. It simply implies that most adopted practices are likely to continue, and others that are less well adopted are likely to remain as such. The reviewer would however recommend that for the remainder of CATALIST-Uganda in the northern regions that the programme gives proper attention to continuing capacity building of groups and clusters, to deepen understanding of good practices, group marketing and input linkages. It would likely be a mistake to try to push ahead training new farmers in the 14 months left before the end of the programme. Training new groups would be unlikely to have sustainable impact, because many (or most) farmers do not adopt in the first season of training and demonstration. They require proper backstopping in the second season (particularly around marketing and chemical input application) for adoption to be successful.

As far as finding other financiers, IFDC and EKN is better placed to make a judgement call on who that could involve. However, the reviewer notes that nearly all farmers in the sample in the northern regions had not previously benefited from other agricultural projects, as there are not so many donors/agencies working in the sector (let alone working on sunflower and soya). While many NGOs were observed operating along the main roads out from Lira, most were working on issues such as WASH, post-conflict issues, education etc.

Comment on the impact of the project at the mid-term point: Are there any indications that the programme is on track to achieve long term change?

CATALIST-Uganda is achieving measurable impact in terms of promoting changes in practices (both production and marketing sides, as well are group activities), changes in yields, as well as achieving some value chain changes in terms of better input provision and linkages (especially seed and fertilizer). These changes have been described in detail above in the respective sections, and were confirmed through both quantitative analysis of survey data and triangulation with focus group discussion data and interviews with project partners. The project is generally on a good path towards sustainable impact (i.e. long term change) with potato and rice farmers, although there is more work to be done with sunflower farmers. In saying this, long term change is dependent on the level of support these farmers will continue to be given in the final year. Many in our sample have only received support for one year so far, which is usually considered insufficient to be confident of lasting change just yet. CATALIST-Uganda implementing partners frequently made the point that achieving long term change requires more than one year of training and another year of backstopping if most farmers (i.e. not just early adopters) are to permanently change production and particularly marketing practices. Likewise, strengthening group dynamics and developing/consolidating linkages with input suppliers and financial institutions will need ongoing attention in the final 14 months of CATALIST-Uganda to offer good prospects for sustainability.

Are the project's current targets realistic? If 'no,' what would be considered a realistic revision?

Some project targets are realistic and are on track to being achieved. Others are not realistic and over committing resources to the chasing of unrealistic targets is a threat to the sustainability of other aspects of the project. The following are the reviewers views on specific targets and suggestions for revisions, taken from the CATALIST-Uganda indicator performance tracking table (IPTT)

Objective 1: Smallholder farmers improve production, productivity and quality in commodity-specific cropping systems (Production Push):

1.1. *Increased production of rice, cassava, Irish potatoes, soy bean and sunflower, as total cereal equivalent (in MT) by CATALIST-Uganda farmers:* It is difficult to judge whether this is realistic as it really depends on #beneficiary farmers (per commodity) * #farmer production. So while it is interesting as a final variable to calculate, it is not very helpful for tracking programme progress

1.2. *Increase in farm income from CATALIST-Uganda in UGX and households (O/W %women and youth). Assumptions: Women have access to land and increasingly property rights. Average net annual income per farmer per priority commodity. Assumption is that by the end of the project participating farmers will be able to double their net annual income.* This appears to be unrealistic. First, it is suggested that the programme is unlikely to have an impact on women's access to land and property rights as these are structural and legal issues that CATALIST-Uganda does not confront head on. However, the programme is having a direct impact on household and community issues around gender, and targets on gender should be situated at that level.

Second, farmers are unlikely to double their annual income from CATALIST-Uganda for the simple reason that farmers only have a percentage of their land under CATALIST-Uganda focal crops, and that they derive income from many other crops and other sources too. More realistic would be to double net annual income from the CATALIST-Uganda crop in each season only. But even still, this would be very ambitious and it is rare for a programme to even double yields on average, let alone to do so within effectively 3 years (the first year of CATALIST-Uganda was rightly focussed on setting up the proper structures and partnerships. Moreover, by the end of the programme many beneficiary farmers will only have received a package of trainings/ demonstrations on how to farm more efficiently as a business. Some will not be willing or able to make the necessary investments to benefit to the full. The reviewer would suggest that if beneficiary farmers increase their mean annual income from the CATALIST-Uganda crop by 50% this would represent an impressive achievement and more than most programmes are able to achieve. As a general comment, a programme like CATALIST-Uganda really needs to be running for five years at a minimum to achieve these sorts of target changes.

Third, the target of 110,000 farmers to have doubled their yields and incomes is unrealistic for a four year project of this nature. The project implementation period for directly working with farmers is effectively 3 years because the first year is largely about setting up implementation structures. Furthermore, it is suggested that it is not wise to add new farmers in the final year

because they will not be able have the full multi-year backstopping and support required as per the programme design. This leaves effectively years 2 and 3 for recruiting and working with at least 110,000 farmers. To achieve the target more than 110,000 farmers need to be engaged in the project as there are always drop outs, and those who are unable or unwilling to make the investments required for change.

IFDC has been relatively constrained with regards to its internal resourcing to start up much faster than it has done. Furthermore, IFDC has had some difficulties identifying and contracting the high quality implementing partners required simply due to partner availability. Implementing partners likewise stressed they have been seriously resource constrained and it was very common to hear them saying that they had too many groups to attend to with the attention and detail they would have liked. The reviewer understands that at the end of 2014 IFDC has managed to work with around 54,000 direct beneficiary farmers, which in the reviewers view is a good effort given that this has involved in-depth support, not one-off trainings.

It should be understood if IFDC chases the high target of 110,000 beneficiary farmers in the final year of the project then will be diverting resources and attention away from more structural value chain issues (e.g. ABCs) that need attention as well diverting support away from existing farmer groups. This will have implications for impact and sustainability with existing farmers, while possibly not achieving much with new farmers in such a short timeframe. It is suggested that IFDC goes with what is feasible. With the additional 10,000 additional farmers or so that IFDC have already planned to work with in the near-term, this would bring the number of farmers reached to around 65,000-70,000.

As for the additional numbers up to 110,000 farmers, the reviewer would suggest that IFDC and EKN look more broadly at the indirect impacts and chain level impacts on non-beneficiary farmers in the intervention areas. This would include, for example, seriously focussing on improving the seed potato multiplication (say, through seed farmer groups and clusters) which would have a large indirect impact on thousands of ware growers in the region. Likewise, improving input supply linkages and rooting out fake inputs would have a big impact beyond direct beneficiaries.

1.1.1. *Average increase in agricultural productivity for rice, cassava, potatoes, soy bean and sunflower (Farmers will be able to double their yields):* This is an extremely ambitious target. Essentially it is saying that with two years of support (one of training and one of backstopping) that this is enough to convince most farmers to make the necessary investments and changes in practices. The reviewer has never previously evaluated a project which has actually achieved this, and when consulting other senior colleagues at KIT they agree that virtually all projects they know of would fail this target. While rice yields appear to be averaging double the baseline, and potato is also doing very well, the reviewer has some doubts as to the accuracy of the baseline data for rice. A separate study that the reviewer was

part of in 2012 put the baseline yield much higher than the reported baseline[7]. Looking at rice national averages is also problematic as many farmers in the CATALIST-Uganda programme farms lands that benefit from rice irrigation schemes, whereas many in national surveys do not, which would pull down the average.

1.1.2. *Returns per labour day for rice, cassava, Irish potatoes, soy bean and sunflower:* This target is largely dependent on yield and price changes, and input investments. If yield increases are achieved this target will very likely to be achieved. It is also noted that labour costs per day are around 5000 UGX for hired labour, so it stands to reason that returns to labour are marginally higher than this.

1.1.3. *Decrease in per unit cost of production (UCP = TCP (UGX) / TY (Kgs)) of the priority commodities (rice, cassava, potatoes, soy-bean, sunflower):* This target appears to be realistic and according to my calculations is currently being achieved (see Annex for full details).

1.1.4. *Number of participating farmers (F/M) adopting and applying correctly at least 2 elements of commercially sustainable farming practices:* This target is very likely to be achieved. Nevertheless, the reviewer is a little concerned whether the baseline data was designed to capture this and there is uncertainty regarding the proxy indicators to definitively measure this. The reviewer found it difficult to unpack from IFDC exactly what proxy indicators should be used for the MTR. It is clear that there are a set of nine good agricultural practices (GAP) that CATALIST-Uganda aims to implement, those being:

- Crop rotation considerations (the choice of what to produce and when).
- Land preparation; minimum tillage.
- Plant nutrient requirements; fertilizer kinds, amounts and when to apply.
- Crop establishment methods; planting density, arrangement
- Weed control
- Integrated pest and disease control
- water management
- Harvest methods
- On-farm storage methods.

However, while this is a valid list of GAP, each one needs particular indicators that can be measured. For example, what is it about weed control that would qualify as 'achieved'? Furthermore, because each crop is different, indicator targets should probably be specific to each crop. For example, water management for rice would require different indicator targets than for potatoes. So while the reviewer is confident that good progress is being made in most of these GAP, it is not easy to *measure* this progress because some GAP lack specific SMART indicators[8] that can be measured.

[7] F.Zaal., R. Bymolt., B. Meertens. (2012). Rice Production Survey Report, Tanzania and Uganda 2012. Gatsby Foundation. (available on request)

[8] SMART refers to indicators which are: Specific (to the change being measured); Measurable (and unambiguous); Attainable (and sensitive); Relevant (and easy to collect); Time bound (with term dates for measurement). See http://betterevaluation.org/sites/default/files/EA_PM%26E_toolkit_module_2_objectives%26indicators_for_publication.pdf

1.2.1. *a) Total number of participating farmers (female/male) using recommended quality inputs (certified seed/planting material, fertilizers and/or herbicides):* The reviewer does not like this indicator for the fact that it combines several indicators in one. The reviewer suggests that instead an indicator target should have been set for each input separately (e.g. one each for fertilizer, herbicide, pesticides, fungicide, etc.). Separating these would give a better indication of what is happening with regards to inputs, since it is often the case the farmers adopt some but not all recommended inputs, and often do so using different quantities.

1.2.1. *b) Number of farmers using certified seed/planting material (EKN):* The target is not defined in the IPTT. Also what is 'certified' is difficult to assess, particularly because farmers are not clear as to what qualifies as 'certified'. For potatoes, there is a desperate shortage of clean seed. For rice there has been a large uptake in Wita 9. For sunflower, farmers are largely dependent on companies such as Mukwano to provide hybrid seed, which is outside of the control of the project.

1.2.2. *Use of agri-inputs (fertilizers, herbicides, certified seed) in Kgs/acre(EKN):* As discussed in 1.2.1, the reviewer would have preferred this to be broken down into one indicator target per input and per crop. Care also needs to be taken where some input weights will vary according to the brand. The target is otherwise appropriate, and it is good to see the project is concerned not just with binary yes/no usage, but with proper quantities being applied.

1.2.3. *Number/percent of participating farmers receiving technical support in use of new technologies from the CATALIST-Uganda project:* This would be difficult to assess what constitutes 'new technologies'. The target needs to be more specific.

1.3.1. *Percentage reduction in post-harvest losses for rice, Irish potatoes and soy bean as a result of CATALIST-Uganda interventions:* The target is probably realistic it should be noted that farmers (and indeed enumerators) can have difficulty determining what constitutes a post-harvest loss in some cases. Usually farmers count a post-harvest loss in terms of what is lost after it has been bagged. With rice for example, unmeasurable percentages can be lost during threshing and improvements can be made with the use of tarpaulins. So the indicator is ok, but it is cautioned that this is difficult to measure unless one is only talking about losses after bagging and storage.

2.2.1. *Number of formal agro-business relationships formed with Dutch firms/national:* It would be difficult to assess what constitutes a 'formal agro-business relationship'. Also, a neglected assumption would be that Dutch firms are actually actively investing in the target regions and target crops.

Other: Other indicators listed in the IPTT are generally ok, although the reviewer notes that targets are not always defined.

Has the grant's activities of the project to date, met with and supported the objectives of the project? Has the grant activities of the project been a value added?

The grant activities that the reviewer was able to review (roads, processing mills, potato screen houses, research grants) were all judged to be excellent choices in terms of supporting the objectives of the CATALIST. They have certainly added value to the project, each in their own way. For example, roads have enabled vehicles to pass even in the rainy seasons to get crops out and to market, and have measurably reduced transport costs in some cases (e.g. Kisoro, potatoes). Processing mill investments for rice and sunflowers are helping to open up new markets for producers, and at higher quality than existing processors. Existing processors too can apply for grants to make upgrades to their facilities, raising the bar for the sub-sector. Potato screen houses and research grants to KAZADI are good examples of identifying a major problem early in the project (access to clean potato seed) and addressing it through grant investments. (Note the financial efficiency of grants cannot be assessed).

If grants are to be continued in the future, should they continue in the current format?

The reviewer does not see why grants shouldn't be continued in the current format, as neither grantees nor IFDC gave critical comments against the current structure.

How successful has the project incorporated elements of youth and gender into the implementation of its activities?

Youth and gender are frequently cited in agricultural programmes, whilst in reality the pathway to which youth and gender may be impacted is rarely thought through in programme strategy. Nevertheless, CATALIST-Uganda is having an excellent impact with regards to gender, which has been mainstreamed throughout. Approximately half of all beneficiary farmers are women (i.e. members in farmer groups) and there was observed to be female leadership representation in all clusters.

In terms of farming activities, women's roles can be seen in the breakdown of labour days per activity for each of the crops (see Annex, Table 17, Table 32, Table 48). This shows that men have a higher on-farm labour burden than women overall for all crops, but that women do contribute more in certain activities. The main activities for which women have a higher on-farm labour burden than men are: potatoes: Harvesting, weeding; rice and sunflower: winnowing. More men are also hired as labourers than women. The average hired daily rate is slightly higher for men than women for most activities. It is important to look critically at this, not only as a gender equality issue, but also as a reflection of preferences to hire male labour over female labour for certain activities based on expected labour output differences. Hired daily labour rates would be very difficult to challenge within the framework of a programme.

In all areas women and men mentioned quite some changes with regards to gender roles as an outcome of project sensitisation. Frequently respondents of both genders described how men would leave certain activities (especially weeding and to a lesser extent harvesting) to women, whereas now there was more equality with these activities (this is reflected in rice and sunflower labour share data). Also women spoke of how sensitisation has improved household relations, particularly around decision making of how to plan for the season ahead, when to sell, to whom, and how to use the money received from the sale of produce. While it is appreciated that these are anecdotes and are difficult to put numbers to, this was heard in all areas without any reports to the contrary.

In addition, the project has helped with gender in unexpected ways. Improved attention to basic record keeping has led to more transparency in the household. Women say they are involved in the record keeping, and now accompany their husbands to the mill and/or market so they better know what household income from their crops is, and can express their views on how this can be used. In one village this additional transparency was even said to have reduced arguments about money that lead to domestic violence.

Another spinoff of the gender training is that women say men are now more supportive of them starting small businesses. They say that they feel very good about this and have additional money to do more things for the household. Men are positive about this too. When asked why there needs to be a project to make gender changes a range of views are commonly expressed: Men thought "they are the only bright ones before, but learned women can do things too [through the training]"; men were jealous to let women go out before; traditionally women were subordinates and not equal to men; men thought that women would not use the money well or waste it on other men; before when some got money would before not respect their husbands and would buy clothes etc; But respondents said that women have been trained also on how to manage and invest money well, so this has mitigated fears both well-founded and unfounded.

In general men expressed few reservations about gender changes. There were often jokes made in the focus groups about how some men might have been initially disappointed that they can no longer 'cheat' their wives about money. But the mood about this was always light and it appeared that changes in household and farming gender relationships have been accepted surprisingly easily by both men and women.

In terms of youth, no specific activities were done that the reviewer is aware of. Nevertheless the programme appears to have included youth by virtue of the fact that Uganda has a high youth population and a reasonable cross section of focus group participants appeared to be under 25. The reviewer is unsure whether the project collects data on beneficiary farmer's ages to track this.

How well has the project performed in creating an enabling environment for the implementation of the activities and uptake by farmers and agri-businesses?

The project has engaged in many activities and made numerous investments to improve the enabling environment, as discussed throughout this MTR. The majority of these have contributed to the impact described earlier, particularly on beneficiary farmers. The main critique is that more can be done to support changes in the enabling environment by giving increased attention to the ABC structure (at all levels), giving less attention to recruiting large numbers of new farmers, and working more intensively on input/financial/marketing linkages (both through ABCs and bi-lateral arrangements).

Given the current agri-financing situation in Uganda (at all levels of the value chain), can the project reasonably expect to meet its goals? What other (if any) financing models should the project be considering?

Agri-financing has different challenges at different levels. For farmers, the VSLAs have been of enormous benefit to building base financial literacy and managing savings and loans. For most farmers sampled, they have completed one or two cycles with their respective VSLA's and patience is required. As farmers themselves realise, VSLAs are an excellent way for them to build up experience in saving and borrowing in a relatively 'safe' environment. Financial partners spoken with also recognised the advantages of the VSLAs and spoke of it being an excellent stepping stone for farmers towards more formal finance arrangements, as well as a way for them to build up a credit history.

More intensive effort is required to bring banks on board with smallholder financing, although in fairness it has taken time to agree MoUs and even for farmers to gain experience in VSLAs. The reviewer expects to see some increase in smallholder financing in the final year and a half of the programme based on the positive sounds coming from financial institutions. Expectations should be modest however – for many low capacity farmers VSLAs satisfy their financing requirements at the moment, while others are either too risk adverse to borrow, or don't require formal financing. The indication from focus group discussions was that savings and loans are certainly being used in part to make agricultural investments (as well as other livelihood needs).

The most important thing at this stage is for formal lenders to appreciate the business opportunity that exists with smallholders, to learn how to mitigate risk of default, for them to offer good financing options to farmers (interest rates and repayment terms in particular), for farmers to open bank accounts and for the system to start growing from this. There should not be a rush to laissez faire financing however, and care should be taken with which financial institutions are being brought on board. This means choosing well-resourced financiers, to work with and ensuring they have the interests of smallholders very much in mind. The reviewer does not recommend bringing new financial partners on board at this stage unless MoUs are currently being discussed with them because there is insufficient time left in the project for this to be negotiated properly. Many projects perform badly regarding financing modalities and this should be monitored carefully to learn lessons.

In terms of other value chain actors, it was interesting to find that small rice millers were not taking up the financing option available to them to upgrade their facilities (70% generously financed by the project). If not done already, it is suggested that some more sensitisation/calculations be done with these actors to learn about the business model and what the payback period would be.

There is perhaps an argument that the project could consider some strategic farmer group cluster grants for stores (say, grants for materials, farmers provide the land and labour) – given that this was frequently cited as a major constraint to group bulking and marketing, and it was observed that those who did have access to a store were much more likely to attempt group marketing.

It is difficult to think what other financing models the project could consider, and perhaps this is the wrong question. With just a year and a half till the end of the project the question should be about what financing models commercial lenders are offering, and whether these are suitable. New financing models should not be employed at this stage because there is insufficient time to set up the structures, engage partners and pilot these ideas.

Does the programme assist beneficiaries (particularly women and youth) to overcome barriers that might prevent them from exploiting the economic opportunities available to them following the acquisition of new skills?

As discussed at length throughout this MTR, the programme has helped farmers (including women and youth) both overcome barriers and take advantage of new opportunities. In particular this has included farmer training in new production skills, formation and strengthening of groups at various levels, improved access to markets (or more commonly better relations with existing market actors) and better access to improved inputs. Evidence of this can be found in the commodity chapters.

Assess the level of participation of participants in the project

The level of participation has been high among beneficiary farmers – this can be evidenced by the high percentage of farmers saying they had received trainings by IFDC (see commodity chapters). Also, the farmer group structure has been well developed so that farmers are increasingly engaged with each, learning about and reinforcing good practices from the demonstration plots. An interesting spinoff effect was found from the VSLAs – they are actually the reason behind farmers meeting on a weekly basis, and while the primary function is savings and loans, they have an effect on reinforcing group cohesion, especially between seasons.

Is there a good quality results focused M&E system, allowing for periodic reflection and adjustment of activities if needed? Analyse the suitability of the existing data sources and indicators.

Observations of the M&E system are derived from an interview with the Monitoring and Evaluation Advisor at IFDC, from analysis of existing data sources, existing tools for data collection (e.g. past surveys) and analysis of the Indicator Performance Tracking Table (IPTT). When the M&E Advisor was recruited there was said to be nothing already established, but that contact with Rwanda and their experience with CATALIST-Uganda Great Lakes provided some insights on how to go about it. But it was felt that CATALIST-Uganda Great Lakes M&E was itself not sufficiently structure and streamlined so much needed to be developed from scratch.

The M&E Advisor judges CATALIST-Uganda to have made advances over CATALIST-Uganda Great Lake's M&E system. While Rwanda may do more surveys/assessments, CATALIST-Uganda is thought to do more *verification* of partner's activities (rather than accepting what partners report). Furthermore CATALIST-Uganda has started to develop an online system. This was designed by an IT person in consultation with IFDC partners. The software is installed on laptops and is structured for reporting and updating IFDC on activities. This software partly covers for a lack of IFDC staff capacity in the field.

One challenge earlier in CATALIST-Uganda was that each partner was reporting based on its own systems, and CATALIST-Uganda had to learn to really spell out its reporting requirements to partners to ensure consistency in reporting. A related issue is partner's staff capacity to do their monitoring work as desired, and the IFDC M&E Advisor notes that IFDC has its own capacity challenges to train partners and track their progress in using the IFDC reporting system. This is apparently improving as it is getting past simple inputs and outputs towards outcomes monitoring. With regards to the Indicator Performance Tracking Table (IPTT), see comments made in the section on targets.

In terms of data availability, the reviewer is a little concerned that some basic information for this MTR was unavailable. Regarding country data, it is well understood that this is not always available or reliable, so country data is not commented on further here. However the reviewer was more surprised that a lot of baseline data on input use, input amounts used/prices paid, and accurate labour day data was not available. For without this it is impossible to measure things such as returns per labour day and changes in unit costs of production. The reviewer is surprised mainly because these things are in the IPTT and if they were not in the original baseline then they probably should've been collected in a follow-up round. It is however worth emphasizing that this is very difficult data to collect accurately, and hence simple questions such as return per labour day and changes in unit cost of production can be deceptively difficult to answer because they depend so much on accurate data on a range of data points including input amounts and costs, labour days and costs for all activities, and yield and price data.

The reviewer will not go into a full analysis of the baseline questionnaire and data, however it is noted that many of the farm activities that are undertaken in the course of a season are not in the baseline survey, meaning that previous calculations must be under-estimating the true costs of production. Rice

is a case in point, involving many more farming activities than data was collected for in the baseline. It was however pleasing to see that IFDC attempted to collect data on household labour (however imperfectly) and that an attempt was made to cost this. Some other programmes try to ignore household labour as a real cost, and it should not be ignored.

It is understood that IFDC has had some challenges with its M&E support from consultants also. IFDC's office in Kampala has only the M&E Advisor, and there are no additional M&E staff assigned for the regions due to staff resource constraints/restrictions in the structure of the CATALIST-Uganda contract. Therefore consultants were relied on for certain M&E activities not just for third-party transparency but also due to the aforementioned resource constraints. The reviewers understanding was that some of these contracted parties did not perform to the quality expected, partly due to the subcontracting out of activities. A detailed judgement on this process is unable to be made here, but it does emphasise that core programme activities (such as baselines and endline evaluations) require high quality consultants and that the financial side of tenders should be a relatively marginal consideration for a programme of such size as CATALIST. Quality data is of the utmost importance.

Overall it needs to be acknowledged that CATALIST-Uganda is a large, complex programme spread over a wide geographic area. The M&E Advisor had to deal with the fact that Regional Coordinators were themselves often stretched and unable to give the support desired at all times. So it is clear that there has been a lot of effort put in to making the M&E work, but that it has come up a bit short due to challenges with external consultants, partner capacity in monitoring, and internal M&E capacity and resourcing.

What are the less tangible results and unintended effects of the projects (both positive and negative)

The results, both tangible and less tangible, have been elaborated on throughout earlier in the MTR. Some good examples of less tangible results (previously discussed) were:

- Basic record keeping on crop production and marketing leading to improved transparency in the household between husband and wife, which in turn was said to be a driver of more open discussions on planning and decision making, and empowerment of women in the household

- Gender training seems to have had a much greater impact than just a fairer distribution of farming burden and control of farm income. This was surprising because CATALIST-Uganda gave gender relatively modest attention, but it perhaps shows how a little gender sensitisation can go a long way if there is trust in the partner giving the training. CATALIST-Uganda had that trust, because the other activities they were doing were perceived positively by beneficiary communities.

- VSLAs have a role beyond savings and loans. They are also playing a role in group cohesion, governance and agricultural knowledge sharing by virtue of farmers coming together once a

week to save. VSLAs are a reason for farmers to stay close even between seasons and appear to be an excellent mechanism for group sustainability.

Are the project results effectively communicated to the wider public?

Project results are mainly communicated to the wider public through the website http://ifdc.org/catalist-uganda/ . As per the website, three newsletters have been put out explaining different elements of the project and how it intends to achieve change. In fairness, with the MTR just being completed, 'project results' as such are just emerging. CATALIST-Uganda is sufficiently communicating the project purpose to the public at this stage, and the website is a suitable platform to communicate results to the public as studies are completed. Probably some of those larger studies will need to be condensed into a format that is visually rich and engaging, perhaps making use of infographics.

Operational/management capacity

Does the project have sufficient operational and management capacity in place to implement/deliver project services and monitor, assess and respond to changes?

Clearly IFDC and partners have invested considerable energy in designing a strategy for delivering a complex and multifaceted project. As this MTR shows, the programme is achieving some good results overall (even if there has been less progress in some areas than others). In saying this, every implementing actor interviewed (all IFDC staff separately at Kampala HQ, and regional offices; all local implementing partners) stressed that their capacity to deliver services was constrained in one way or another over and above their experiences with previous projects.

For example, IFDC feel that the 23% overhead rule is a constraining factor for properly managing the complexity of a project with ambitious targets and short timeframes. Staff numbers are felt to be too low at both country office and regional offices, holding back the project from tackling multiple issues at one time. This partly explains why IFDCs original strategy was to get the production side up and running first before turning their attention to the marketing and value chain issues.

Implementing partner capacity is also a problem recognised by both the partners themselves and IFDC. Partners feel they have insufficient time (especially number of seasons) with each farmer group and also too many groups to manage. This has been recognised by IFDC and changes are being made.

Monitoring and reporting capacity is also insufficient according to all interviewees, although this is improving through ongoing capacity building and some online tools *(see question: Is there a good quality results focused M&E system […]?*).

In terms of capacity to respond to changes, all of the above mentioned capacity constraints apply. But an additional one would be the length of time of the programme. For a project of the size and complexity of CATALIST, there is very little time available to make structural changes to the programme.

Does the project have sufficient operational and management capacity in place to ensure effective and efficient use of resources?

This question is closely related to that above, and the response is similar. While donors rightly keep a close eye on overhead and management costs, at some point a lack of resources for operations can lead to less effective and/or less efficient use of resources. While this is difficult to judge absolutely (there is no way for me to assess management/operations against a counterfactual) it would appear that the project is walking a fine line. As stated above, additional resources would've helped IFDC with planning and strategy, M&E, reporting and responsiveness to change. The window for additional resources to be invested in this may have closed, since the project only has just over a year to run.

Proposed Future strategies

What are the prospects for sustainability of CATALIST-Uganda Uganda project results and which results are most likely sustainable and why?

The prospects for sustainability are mixed, and it is argued that much depends on how IFDC approaches the final year and a half.

- South-western (potatoes): Some excellent progress has been made on changes in practices and input use leading to higher yields and ultimately higher profits. Changes in farmer production practices are expected to be sustainable, provided the input supply chain linkages are consolidated. A major risk is ongoing deterioration of planting material, and IFDC would be wise to intensify efforts on clean seed multiplication (as discussed earlier). The reviewer is less optimistic about changes in marketing practices and farmer clusters. This is because geography is a challenge for marketing – some clusters are not close enough to each other (and moving sacks of potatoes is heavy work). Also groups/clusters lack stores which is emerging as a major constraint to changing marketing practices, and convincing traders that farmers can be more coordinated and leading to higher prices. Sustainability (and impact) with group marketing is certainly possible but it is cautioned that these changes require much more focussed support and capacity building than just two seasons of support. Group marketing is usually the hardest thing for groups to sustain. As mentioned under 'less tangible results' the role of VSLAs is playing a surprising positive role in farmer group strengthening and financial capacity building, so this should help. At present the ABCs at

higher levels than farmer clusters (sub-county, district, apex) need much more attention, and presently it is doubtful that they would continue without the coordination of CATALIST.

- Eastern (rice): Some very good progress has been made on changes in practices and input use, and farmers believe that yields have certainly increased significantly (even if it is believed that the baseline yield data underestimated starting yields)[9]. These gains are likely to be sustainable, although the reviewer cautions against withdrawing backstopping support even for groups who have had a season of training and one of backstopping. Farmers had plenty of questions for the reviewer in focus group discussions around good practices. There has been some encouraging progressing on group marketing but, as described above with potatoes, this is still a new thing for most groups/clusters and they will need more support as they build their capacity in group marketing. Issues around trust, good governance, storage, timing of sales etc. are just some of the dimensions affecting group marketing sustainability. Again, the ABCs at higher levels need much more support. Possibly there is the opportunity to link in with Africare efforts to develop a rice platform.

- Northern (sunflower): There has been much less progress in the Northern region overall, so there are fewer results to which sustainability can be assessed. Despite a low level of adoption of new practices (e.g. in chemical inputs which are difficult to source and are relatively expensive) many farmers could recall technical aspects of the training they had received in surprisingly accurate detail. This suggests that the sensitisation is there and with a little more support with input supply linkages much higher adoption is possible. So there is still an opportunity to achieve some impact and sustainability with *some* of the beneficiary farmers worked with so far (see 'adjustments' question below). The MTR data finds that input linkages are extremely poor in the Northern region, and not helped by systematic adulteration and marketing of fakes. These input issues are a serious threat to progress on impact and, by extension, sustainability. In terms of group marketing, this is really just beginning (one or two seasons experience) and it is difficult to judge long term sustainability. The sense from a number of focus group discussions and interviews is that the picture is mixed: those with access to stores are most interested and able to engage in group marketing. Variables such as group leadership capacity and access to roads/processors all play a role in group marketing potential and sustainability. The ABC at higher levels is a challenge, and it was difficult to see much interest or motivation from value chain actors on the ground to really coordinate. This should not be surprising – for example, input suppliers have no shortage of customers in Lira, and inputs are in high demand without needing to travel to rural areas. Mukwano (the largest buyer) is believed to have an established agent network on the ground, through which it coordinates hybrid seed supply and procurement. The reviewer wonders if a better strategy would be to focus on improving many bilateral relations between actors/groups and practically making some improvements. The concern is that setting up

[9] See for example, Bymolt, R., Zaal, F., Meertens, B (2012). Rice Production Survey Report, Tanzania and Uganda. Gatsby (available on request)

ABCs at different levels at this stage would achieve little among disinterested actors who have little incentive to improve coordination (especially coordination with smallholders).

- Other: The reviewer is of the opinion that there is an excellent prospect for sustainability of VSLAs, as only good things were heard from farmers in all areas and many have completed two cycles thus far. Gender changes also have a good chance of sustainability, although the reviewer is uncertain about what kind of backstopping is in place to continue promoting gender in the programme. The reviewer believes that grant investments all made good sense and have good prospects for impact and sustainability, however it is difficult to say more about this because some of these investments have been made recently and/or are just coming online (eg road completion, investments in processors, research grants).

What if any adjustments would you recommend for the project in terms of geographical coverage, targeted beneficiaries and enterprise choice?

Throughout this MTR the reviewer has tried to point out a number of strengths and weaknesses of CATALIST-Uganda at present. However, adjustments in scope/targeting have to be seen in light of the time remaining and resources available. Therefore, the reviewer presents a fairly focussed list of possible adjustments here. It is up to IFDC to judge the merits of these suggestions against the feasibility of applying them, as they will know best about feasibility from a programming perspective.

A general point on targeting of smallholders: The programme objective is to *"sustainably commercialize smallholder agriculture through improved productivity and market development"*, and as such smallholders with a reasonable potential and capacity to make investments should be targeted. Smallholders are heterogeneous – different 'levels' of smallholders can be discerned (e.g. wealth, land size, education/knowledge etc.). There will always be a few farmers in every group who will not be willing or able to make the investments required for commercialisation. However what the project needs to take care to avoid is working with entire groups that lack basic capacities or are too disconnected from markets. These groups have much lower chances of realising impact from CATALIST, and at some point intensively working with such groups is not an efficient use of programme resources. For very low capacity and poorly connected smallholders other types of interventions (such as livelihood approaches) carried about by different programmes and agencies may be more appropriate. It is suggested that CATALIST-Uganda does some basic stocktaking of where each farmer group and cluster is at, and whether the group has shown sufficient potential after initial support to continue working with them on a graduation strategy, particularly in marketing.

- South-western (potatoes): Geographical coverage is good and targeting of beneficiaries has been generally fine. There was one group in the sample where their capacity to invest was considerably lower than other groups (it happened to be a women's group). The focus on potatoes is clearly appropriate to the area, and a profitable option. The reviewer reiterates earlier comments regarding a more intensive focus on potato seed sector development and the

necessity to specifically train clusters of higher capacity smallholders located near to the screenhouse grantees in the multiplication of basic seed.

- Eastern (rice): Geographical coverage was found to be good and targeting of beneficiaries appears fine. Rice is clearly an appropriate commodity to the area and a profitable option. IFDC should be cautioned not to get dragged too far into other crops in the eastern region (barley and potato) as there is plenty of work to do on rice. Other crops might be better targeted in a future intervention/phase.

- Northern (sunflower): As mentioned earlier, sunflower (and soy) has had to contend with greater challenges (post conflict context, higher poverty profile, poor linkages/infrastructure etc) which have invariably contributed to poor results thus far. The programme's targeting of farmer groups has not helped in this regard. In the North, more than in other regions, good targeting is essential because too many farmers simply do not have the capacity to make basic investments or are too remote and disconnected to markets (both input markets and buyers). In short, it is no use delivering trainings if few farmers in a group have prospects of adopting. More than the other regions a stocktake needs to be done on which groups to continue working with beyond the basic support package. At this point of the programme, training new farmers in the northern region would likely be a waste of resources when there is much to be done with existing CATALIST-Uganda farmers. In the time remaining farmers will only be able to receive one season of support in both sunflower and soy, and experience thus far shows that farmers tend to observe and test the training's appropriateness through the demonstration plot in the first season and only in the second season do most farmers *begin* to adopt. Furthermore, present adoption rates in the northern region are low. The reviewer would expect the programme to achieve greater impact by continuing to work with existing farmer groups who have shown some potential in their results thus far. The reviewer believes that the sunflower/soya crop choice was actually a fairly good one despite IFDC questioning themselves a little. Farmers unanimously believe sunflower to be the most profitable crop option (or 'least worst' option), and better even than soya. Sunflower and soya are a good rotational match, grown in 'A' and 'B' seasons of the year and so it was a good decision to work with both. The reviewer doesn't support diverting resources into other crops such as cassava as this is simply a distraction to the commercialisation objectives of the programme. The reviewer notes that sunflower prices have nearly doubled in the past 5 years, and that the main thing holding farmers back is not the lack of a market but access to inputs and their adoption alongside other improved production practices. Finally, participatory budgeting exercises conducted during focus group discussions found soya to be no more profitable than sunflower (marginally less so), which is in line with farmer perceptions of profitability. Therefore, the reviewer would not abandon sunflower for a sole focus on soya.

Summary of lessons learned and recommendations

The following summarizes lessons learned from the MTR and offers some recommendations for the programme. The reviewer appreciates that the feasibility of implementing recommendations depends on the time and resources available. Some of the lessons learned and recommendations should also provide valuable insight for follow-up phases of CATALIST-Uganda or for other projects that wish to build on the gains made here.

CATALIST-Uganda is achieving measurable impact already and is on a good trajectory towards sustainability with potato and rice farmers, although there is more work to be done with sunflower farmers. However, long term change is dependent on the level of support these farmers will continue to be given in the final year. Many respondents in the research sample have only received support for one year so far, which is usually insufficient to be confident of lasting change just yet. The recommendation is to support beneficiary farmers with more than a single season of backstopping in order to achieve long term change. This is particularly important for strengthening group dynamics, group marketing strategies and developing/consolidating linkages with input suppliers and financial institutions

Farmers are correctly applying at least two elements of commercially sustainable farming practices[10], particularly row planting and spacing, and are increasing their use of inputs (especially for potatoes and rice) leading to better crop establishment, weed control and pest and disease control, and ultimately higher yields and profits. The recommendation is to continue with this work as the results are good. The main caution is to not pull back support to farmer groups too early. Implementing partners believe that farmers need more than one season of training and one season of backstopping to make sustainable changes in their practices. A case in point is chemical preparations, where farmers expressed a lack of confidence in how to mix chemicals, there are doubts that this is being done safely. In the first season of support most farmers only apply the new practices in a demonstration plot and the following year is the first time they try these for themselves.

Chemical input use has increased considerably in potato and rice areas. This shows that this component of the project works – farmers will make investments if they are given training and see the benefits for themselves by directly working on demonstration plots. If they have funds to invest farmers will purchase inputs, provided there is reasonable availability from agro dealers near their community. The failure of most sunflower farmers to take up chemical input use partly reflects the targeting of the programme as well as the poverty profile of the area. Many sunflower farmers are too disconnected from markets providing inputs, and many lack the resources to make basic investments in their farms to an extent not usually encountered in the potato and rice areas. The recommendation is for CATALIST-Uganda to pay particular attention to the profile of smallholder groups it targets, particularly in the sunflower growing areas, as not all farmers are able to make the step to farming as a business – even with CATALIST-Uganda support. IFDC should also intensify its work on input

[10] These are: Crop rotation considerations (the choice of what to produce and when); Land preparation; minimum tillage; Plant nutrient requirements, fertilizer kinds, amounts and when to apply; Crop establishment methods; planting density, arrangement; Weed control; Integrated pest and disease control; water management; Harvest methods; On-farm storage methods.

market linkages and bulk purchase sensitisation and coordination in the final year and a half of the programme because these efforts are showing results (higher usage, lower costs), and strengthening these linkages will improve prospects for long term sustainability.

The cited goal of CATALIST-Uganda Uganda is to *sustainably commercialize smallholder agriculture […].* CATALIST-Uganda should **target those smallholders who can make the step up** and graduate to a more business orientated approach to farming, compared with subsistence agriculture[11]. Low capacity and remote smallholders might benefit more from a different approach in a different programme than CATALIST. The recommendation is for CATALIST-Uganda to more selectively invest in smallholder groups where there is a realistic prospect of commercialisation resulting from the programme. This is particularly an issue in the Northern region.

Project successes in some areas can lead to new challenges. **A lack of availability of spray pumps** is becoming a serious challenge. As more farmers wish to use pesticides there has come to be insufficient supply of pumps and pump service providers to meet demand for timely spraying application. The recommendation is for IFDC to review how this situation can be addressed, such as through training and equipping more spraying service providers.

There is much potential for improvements in smallholder profits from sunflower if production practices introduced by the programme are not taken up by farmers. For example, prices for sunflower have almost doubled in the past 4 years as large and small processors are increasingly in competition. However, it is the production side (particularly access to and use of quality inputs) that is holding back sunflower farmers rather than the marketing side, where there is good demand. Although sunflower profitability is low, it is still the best (or least bad) crop option. The recommendation is to continue with sunflower in a more focussed manner, working with sunflower (and soya) farmers who are closer to input supply markets and have slightly higher capacity to invest. From this approach CATALIST-Uganda should see results and can learn how the agricultural sector can be transformed in the northern region post-conflict.

Access to quality seed is the biggest issue for potato producers in the South-west and widespread diseased and deteriorated seed stock is a threat to the sector, greatly affecting yields. The recommendation is for CATALIST-Uganda to give serious attention to the potato seed sector by intensifying efforts with KAZADI and screenhouses but also by expanding the programme scope to support farmer groups/clusters to exclusively multiply high quality seed potatoes (rather than ware). This will have considerable indirect benefits to ware potato growers throughout the region if done at scale. It is cautioned that training seed potato multipliers is more difficult than ware growers and focussed attention from training partners will be required for this, as well as diffused light stores.

Adulterated inputs are widespread in the programme areas (and throughout Uganda) and disincentivise farmers from using inputs because either they do not perform as expected (contributing

[11] The CATALIST-Uganda programme brochure states that "the project will target those farmers that possess or have access to a certain amount of land and productive assets and therefore can accept a certain level of risk. The project will focus on farmers that have access to markets and market infrastructure such as roads. […] The most vulnerable farmers (those with little or no land holdings or assets) will not directly be targeted by the project's agricultural activities, they will benefit from the project's public works component, which can assist in asset accumulation. See https://ifdcorg.files.wordpress.com/2014/12/cat_uganda_brochure_web.pdf

to on-farm losses) or are simply a waste of time and money to source. The recommendation is for IFDC to continue trying to find and promote honest suppliers. Long term this needs to be taken up by all value chain actors (including through the ABCs) and government. IFDC and CATALIST-Uganda should play an advocacy role here, and where possible identify 'best bets' for improving this situation and getting other partners (particularly government and input dealers) on board.

Farmers have a general understanding of a crops profitability, but not in a detailed sense. **CATALIST-Uganda has sensitised farmers on record keeping**, and there are improvements in this regard. Farmer group leaders clearly know costs for various inputs, the cost of hired labour per activity, and revenues and often brought a log book with them to show during focus group discussions. It is encouraging that this information is being captured in the community, to help farmers make informed decisions. The recommendation is to continue to emphasise the importance of record keeping and support farmers with this as levels of record keeping remain low overall.

Farmer groups are working well and most **farmer clusters** are building their experiences, particularly with group marketing. However, the **higher level ABCs** are not functioning as envisaged. Since the agri-business cluster structure is integral to the CATALIST-Uganda model the recommendation is to give this much more attention in the final year and a half of the programme in order to build value chain linkages. Such linkages are key to programme sustainability. Nevertheless, CATALIST-Uganda has had many small wins brokering bilateral relationships between chain actors. These include introductions of financial institutions to farmer groups and clusters, linking clusters with processors, building traders association capacity and linking them with farmer clusters, and linking farmer group clusters with reputable input suppliers. It is now for CATALIST-Uganda to try to formalise some of these structures and relationships between value chain actors in the remaining time available to the programme.

On the marketing side, CATALIST-Uganda has taken generally a pragmatic approach to working with market actors as they have found them. This has meant working with 'best-bet' market actors active in the respective areas, be they traders, small processors, or large offtakers. This has been a sensible approach and the recommendation would be to continue with this approach whilst remaining responsive to new market opportunities that may emerge with time and through the stimulation of CATALIST-Uganda activities.

One major constraint to group marketing is a lack of appropriate storage for farmer groups and clusters to bulk together. This challenge was highlighted in every region, and perhaps illustrates the fact that group marketing is a new experience for most farmers. Those farmer groups fortunate enough to have existing stores nearby were found to be applying the marketing knowledge gained in the programme well and engaging in group marketing efforts. However, those without stores have found it difficult to coordinate group bulking, as without a common store to check produce into, farmers tend not to commit to the group and side-sell individually as before. Buyers too need reliability of supply from farmer groups and clusters if they are to buy on improved terms. Therefore the recommendation is for CATALIST-Uganda to consider and test models for increasing storage options (eg grants, co-investments, store leasing, etc.) with farmer clusters in the remainder of the

programme in order to learn what works best in different contexts. Without storage facilities the sustainability prospects for group marketing beyond CATALIST-Uganda are not nearly as strong.

The **grant activities** reviewed were all judged to be excellent choices in terms of supporting the objectives of the CATALIST-Uganda and were found to be adding value to the project. It is recommended that grants generally continue in the current format, as neither grantees nor IFDC gave critical comments against the current structure. IFDC may however wish to pilot some alternative approaches with potential grantees who are of a smaller scale (eg small processors) as there has been a relatively low uptake of small co-investments thus far.

Gender has been mainstreamed throughout CATALIST-Uganda and the results are positive in terms of numbers of women in the programme (50%) and in leadership positions, as well as more structural changes in communities and households, particularly around decision making on crop planning, marketing, and decision making on the use of money received from the sale of produce. Women say men are now more supportive of them starting small businesses and they feel very good about this and have additional money to do more things for the household. Men are broadly positive about these changes now that they have overcome initial apprehensions about the increased empowerment of women. The programme has trigger unexpected changes too. Basic record keeping has led to more transparency in the household. The recommendation is for IFDC to monitor these positive gender changes and provide backstopping as necessary. One additional gender finding of note is that men have a higher on-farm labour burden than women overall for all crops, but that women do contribute more in certain activities. The main activities for which women have a higher on-farm labour burden than men are: potatoes: Harvesting, weeding; rice and sunflower: winnowing. More men are also hired as labourers than women. IFDC should look critically at this data and consider the implications in its programming, as this data has not been collected previously.

VSLAs have been of tremendous benefit in developing farmer's financial literacy and providing them with a basic savings and loans facility. Financial partners spoken with also recognised the advantages of the VSLAs and spoke of it being an excellent stepping stone towards more formal finance arrangements, as well as a way for them to build up a credit history. An interesting spinoff effect was found from the VSLAs – they are actually the reason behind farmers meeting on a weekly basis, and while the primary function is savings and loans, they have an effect on reinforcing group cohesion, especially between seasons. The recommendation is for a more intensive effort to facilitate links between banking partners and *appropriate* smallholder groups. Banks stressed in interviews that there is quite some costs for them to travel to farmer groups, and many are not yet suitable candidates. IFDC can assist banks to better target appropriate groups. However, it is not necessarily recommended to bring in new financial partners at this stage of the programme unless MoUs are currently being discussed because there is insufficient time left in the project.

Phasing out may be considered for some farmer groups in Northern Uganda and this makes sense for those which do not have good prospects. Phasing out simply means leaving smallholders with a little more knowledge of good farming practices, VSLAs and gender issues. However, one should not be under the illusion that there are lots of other donors/agencies working in the agricultural

sector (particularly on sunflower and soya) who are ready to step in. Most NGOs in the Northern region were observed to be working on different issues such as WASH, post-conflict issues and education.

Some project targets are realistic whilst others are not. Over committing resources to the chasing of unrealistic targets is a threat to the sustainability of other aspects of the project. In particular, the reviewer has concerns around targets of doubling yields and incomes. (While this is being achieved in some instances, the reviewer is not wholly confident in the baseline data). Nevertheless, impressive gains are being made by CATALIST-Uganda and should be viewed as such. It is extremely uncommon for a programme to be able to achieve a doubling of yields/incomes by working with a group of farmers for only a year or two. Another concern is the target number of farmers expected to double yields and incomes. 110,000 farmers is a very large target considering the necessary quality and depth of support that each farmer receives. The target of 110,000 farmers is not expected to be reached. The recommendation is for IFDC not to divert resources away from its present activities. It should continue with planned support with existing farmer groups/clusters and intensify its efforts in structural value chain issues and linkages (eg through ABCs and bilateral linkages). If IFDC instead attempts to divert resources to enlist large numbers of new farmers at this stage of the programme it will very likely have negative implications for the sustainability of the programme as a whole, whilst achieving little with the new farmers since the remaining programme timeframe is too short. It is recommended that IFDC takes a practical approach, as they have done thus far. At present it is believed that in the region of 65,000 direct beneficiaries will be reached. Furthermore, it is recommended that IFDC and EKN consider including in programme targets the indirect impact of programme investments on non-beneficiaries in the intervention areas. Examples of impacts on non-beneficiaries may include improvements on roads, irrigation systems, processors, quality input and seed linkages and market access. It should be noted that indirect impacts can be very difficult to measure, but this does not make them insignificant.

All IFDC staff interviewed in both the country and regional offices feel **the capacity to deliver services was constrained by the resources available**. The '23% overhead rule' appears to be an important factor here, leaving staff numbers relatively low at both country office and regional offices. This partly explains why IFDCs original strategy was to get the production side up and running first before turning their attention to the marketing and value chain issues. This is difficult to judge as an reviewer, however it should be recognised that CATALIST-Uganda is a particularly complex programme, and as such require proportionally more resources than simpler programmes.

Implementing partner capacity was also an issue recognised by both the partners themselves and IFDC. Partners feel they have insufficient time (especially number of seasons) with each farmer group and also too many groups to manage. This has been recognised by IFDC and changes are being made.

CATALIST-Uganda experienced **difficulties in capturing reliable baseline and M&E data**, particularly around issues of production costs and labour. This not an uncommon challenge for many programmes, and the lesson learned is for quality data collection and management systems to be put in place early, utilizing expert consultancy agencies if in-house capacity is not there. The

recommendation is that when considering tenders, a programme the size of CATALIST-Uganda should place considerably greater emphasis on the capacity of an organisation/consultant to generate quality baseline data rather than on the financial side of tenders, because quality data is vital to measuring progress and responding accordingly through the duration of the programme.

Annex for the Mid-term Review of the IFDC CATALIST-Uganda Project

The following is an annex document that details the analysis that went into the IFDC CATALIST-Uganda mid-term review.

Annex 1. Methodological notes

Accounting for bias

The lead reviewer was conscious of different types of bias that could come into the research and attempted to account for this from the offset. The following are some examples of how this was dealt with.

Sample bias 1: Sampling methods are described above, and the lead reviewer attempted to be random in the selection of farmer groups sampled. However, the reviewers still depended on the regional coordinator to organise the farmer groups for the evaluation team. Regional coordinators should not have distorted the findings by selecting groups that are known to be slightly stronger than the average.

Sample bias 2: The presence of the research team can often attract others from the village who are not in the farmer group. At the beginning of the research sessions in the villages lists were made with the help of the farmer group leader who supported us to kindly ask non-farmer group members to not participate. This ensured that all the surveyed respondents were in fact CATALIST-Uganda beneficiaries.

Respondent expectation bias: During welcoming and introductions with each farmer group, the lead reviewer was polite but explicit as to why the MTR was being conducted and that IFDC was interested not in individuals but in how the programme is performing as a whole over many farmer groups. Therefore individuals were not personally identified and it was made clear to respondents that there was no advantage to exaggerating their responses one way or another. (This is because individuals are sometimes identified in such workshops by NGOs for poverty-related support interventions).

Also, some focus group respondents and interviewees (of all types) may overstate actual changes, or talk about isolated instances in a way that sound like the norm. The lead reviewer is very conscious of such bias, and the best approach is to probe the issue through a logical chain of thought to bring out the full story including reasons for the change and the extent of the change. This qualitative data is also triangulated with the views of other participants/interviewees.

Climate and yield data: There is always a concern when gathering yield data that it may be distorted by unusually poor rains. As meteorological data was not immediately available to the reviewer, some basic questions about rainfall volumes and timing were asked to survey respondents in each region.

This found that farmers perceive the rains last season to be more or less in line with recent averages and thus yield data in the MTR was not affected by extreme weather (Table 9, Table 10).

Table 9 Perceptions of rainfall timing last season, compared with 5 year average (frequency of responses)

	Irish potato	Paddy rice	Sunflower
1) Very early	27	14	11
2) A little early	46	29	33
3) About normal	76	71	110
4) A little late	42	70	59
5) Very late	5	20	24
N	196	204	237
Mean	2.76	3.22	3.26

Table 10 Perceptions of rainfall volumes last season, compared with 5 year average (frequency of responses)

	Irish potato	Paddy rice	Sunflower
1) Much less than recent years	3	7	8
2) A little less than recent years	60	67	59
3) About the same as recent years	61	90	79
4) A little more than recent years	48	53	51
5) A lot more than recent years	38	24	17
n	*210*	*241*	*214*
Mean	**3.28**	**3.08**	**3.05**

Annex 2: Potatoes, South-west Uganda

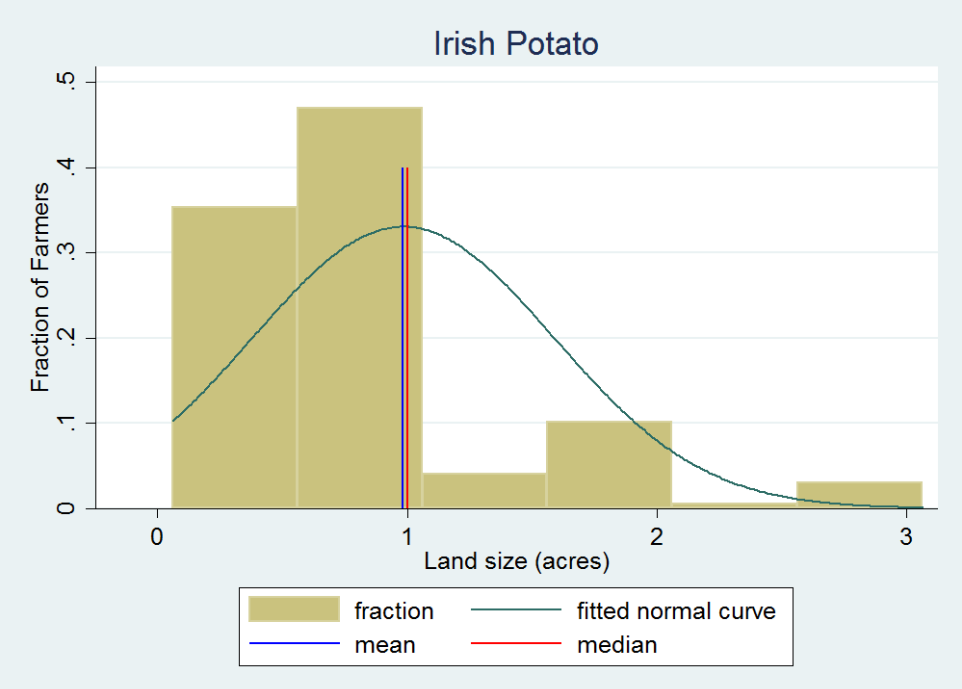
Land

Table 11 Potatoes, land mean size (acres)

	Acres
Total land cultivated (all crops)*	2.21
Total owned	2.21
Total leased	0.52
Total borrowed	0.03
Land used for potatoes	0.98
Of this…Land owned	0.70
Land leased	0.28
Land borrowed	0.01
Land communal	-

Note farmers may own more land than is cultivated (e.g. lying fallow or leased out to other farmers)

Figure 2 Potatoes, land size distribution (acres)



Production practices

Table 12 Potatoes, production practices

Production practice	Irish potatoes	Baseline	Change
Land is terraced	42%		
Land clearing	30%		
Land clearing, herbicides used	41%	34%	+7%
Ploughing, tractor used	0%		
Ploughing, animal traction used	0%		
Ploughing, manual ploughing done	96%		
Seed purchased	67%	52%	+15%
Planting done in rows	98%		
Planting fertilizer used	88%	26%	+62%
Top dressing fertilizer used	4%		
Manure used	16%		
Pesticides used	70%	51%	+19%
Fungicides used	67%	-	-
Herbicides used	4%		
Weeding done	98%		
Crops affected by disease	39%		
Dehaulming done	73%		
Ensuring all potato tubers are removed from the soil	81%		
Seed potatoes stored in DLS	49%		
Crop rotation done	93%		
Intercropping practiced	10%		

Table 13 Potatoes, mean quantities of inputs used per acre

	KGs/Litres
Herbicides for land clearing	1.18
Planting fertilizer	95.26
Pesticides	1.09
Fungicides	3.15
Herbicides for weeding	0.14
Seed	818

Labour

Table 14 Potatoes, labour types used

Labour type	Irish potatoes
Household labour used	82%
Hired labour used	91%
Communal labour used	10%

Table 15 Potatoes, labour days per acre

	All labour	Household	Hired	Communal
Land clearing	2.33	0.59	1.73	0.01
Herbicide application for land clearing	1.21	0.42	0.80	0.00
Ploughing	24.09	4.54	18.47	0.62
Planting	11.95	2.76	9.11	0.09
Planting fertilizer application	4.95	1.10	3.52	0.01
Topdressing application	0.19	0.05	0.14	0.00
Manure	1.47	0.80	0.68	0.00
Pesticide application	3.05	0.78	2.21	0.00
Fungicide application	4.04	1.14	2.52	0.00
Herbicide application (selective)	0.14	0.02	0.12	0.00
Weeding	12.85	2.72	10.00	0.12
Harvesting	16.40	2.74	12.45	0.63
Transporting to store	9.51	0.85	8.43	0.23
Total labour days	**92.19**	**18.49**	**70.19**	**1.70**

Note: Labour day data uses data within 3 standard deviations of the mean (removing outliers) and has been checked for accuracy against described days by participants in the focus group participatory budgeting exercise.

Table 16 Potatoes, labour share, household, hired, communal

Production activity	Household share	Hired share	Communal share
Land clearing	24%	76%	0%
Herbicide application for land clearing	36%	64%	0%
Ploughing	21%	74%	3%
Planting	25%	74%	1%
Planting fertilizer application	25%	75%	0%
Top dressing application	26%	74%	0%
Manure application	61%	39%	0%
Pesticide application	23%	67%	0%
Fungicide application	26%	74%	0%
Herbicide application for weeding	14%	86%	0%
Weeding	28%	70%	1%
Harvesting	17%	78%	4%
Transport	8%	89%	3%
Total	**22%**	**75%**	**2%**

Table 17 Potatoes, labour share, male and female

	Household labour		Hired labour	
	men	women	men	women
Land clearing hired labour	75%	25%	78%	22%
Herbicide application for land clearing	84%	16%	0%	0%
Ploughing	45%	55%	50%	50%
Planting	43%	57%	46%	54%
Planting fertilizer application	49%	51%	54%	46%
Top dressing fertilizer application	100%	0%	83%	17%
Manure application	41%	59%	38%	62%
Pesticides application	80%	20%	92%	8%
Fungicides application	73%	27%	88%	12%
Herbicides application	100%	0%	100%	0%
Weeding	36%	64%	35%	65%
Harvesting	39%	61%	40%	60%
Transport	73%	27%	95%	5%
Total	**64%**	**36%**	**61%**	**31%**

Table 18 Potatoes, labour, daily rates

	men	women	weighted avg
Land clearing	5,354	5,286	5,339
Herbicide application for land clearing	5,631	2,950	5,631
Ploughing	5,168	4,955	5,061
Planting	5,154	4,890	5,010
Bird scaring			
Planting fertilizer application	5,248	5,094	5,177
Top dressing fertilizer application	5,667	3,333	5,278
Manure application	4,641	4,839	4,764
Pesticides application	5,411	5,667	5,433
Fungicides application	5,315	3,294	5,067
Herbicide application for weeding	5,833	-	5,833
Weeding	5,014	4,812	4,882
Harvesting	5,213	4,860	5,000
Threshing			
Winnowing			
Transport	12,107	2,633	11,674

Table 19 Potatoes, mean yield (acres) and price (UGX)

	MTR	Baseline	National
Yield (kgs/acre)	5,341	2,753	2,700
Yield standard error +/-	252		
Price	604		

Marketing

Table 20 Potatoes, marketing sources

Marketing	Irish potatoes	Milled rice	Sunflower
% of respondents marketing at least some of the crop	95%	97%	99%
Local market	5%	1%	1%
Villagers	6%	0%	3%
Company	2%	1%	64%
District market	0%	0%	0%
Traders and brokers	87%	91%	26%
Government buyer	1%	0%	0%
Farmer cooperative	2%	3%	7%
Other place sold to	0%	2%	0%

Training

Table 21 Potatoes, training received and sources

Training	Irish potatoes
% of respondents who have received training	97%
Government	25%
Company	7%
NGO (incl. IFDC)	95%
Research institute	11%
Farmer organisation	3%
Model farmer	8%
Other	0%

Table 22 Potatoes, training types received

Training types	Irish potatoes
Use of improved seeds and planting materials.	93%
Line planting and crop spacing	90%
Fertilizer usage	93%
Herbicide usage	90%
Soil, water and nutrient conservation	80%
Pests and diseases management	90%
Post-harvest handling	82%
Storage	89%
Record keeping	87%
Group formation	73%
Marketing	83%
Village savings and loans (VSLAs)	79%
Other	7%

Credit

Table 23 Potatoes, savings and credit

	Irish potatoes	Paddy rice	Sunflowers
% of households with a bank account	45%	29%	35%
% of households in a VSLA group	78%	80%	92%
% of households borrowing money last year	57%	43%	52%

Farmer challenges

The following describes farmer's challenges related to potatoes as recalled in a number of focus group discussions. After recalling about 5-7 challenges that they faced, farmers were then asked to rank these challenges from 1 (biggest challenge) to 5 (5th biggest challenge). Men and women 'broke out' to discuss this ranking separately, but their responses were found to differ little. For the analysis, the rankings given by each group were given a score so that they could be compiled. When a challenge was ranked in the top 5 challenges by a group it was given 5 points + 1 point per rank. So a challenge ranked as the biggest was given 10 points, whereas a challenge ranked 5th was given 6 points.

The following table shows that according to farmers access to good, clean seed is the biggest problem. While they have learnt about positive selection in the IFDC programme, available seed stocks are diseased or of poor quality (ie deteriorated). Farmers say that they are willing to pay, but that it is virtually impossible to buy clean seed anywhere.

For those few groups with stores, group marketing is possible. However most groups do not have these, and this makes coordination and 'buy in' difficult as farmers can just side sell to traders, undermining group coordination and control.

Table 24 Potatoes, farmer challenges

Challenge	Score	Summary description
Seed	45	Expense, supply of clean, existing stock diseased, deterioration, buying informal
Stores	38	General lack/capacity, people continuing old practices, constraint for group marketing, quality structure preventing farmers holding and waiting, have seen quality stores on Rwanda field trip
Spray pumps	21	Big shortages of supply, delayed spraying or not *doing at all, expensive to buy (200k)*
Marketing	20	Prices, dependence on traders, still being 'cheated' *with bags, difficulty trader acceptance of KGs*
Diseases	17	
Weather	17	
Inputs	14	
Roads	14	

Farm model and unit cost of production

Figure 3 Potatoes, farm model, mean input costs, labour costs, revenues and profit per acre

Input costs	Value (UGX)	Kgs/litres
Herbicides for land clearing	23,944	1.18
Animal ploughing	-	
Seed (including transport)	674,063	
Planting Fertilizer	211,140	95.26
Pesticides	16,003	1.09
Fungicides	39,452	3.15
Herbicides for weeding	1,527	0.14
Transport	145,983	
Total cost of inputs	**1,112,111**	

Labour costs	Value (UGX)	Days
Land clearing	12,367	2.33
Herbicides for clearing	6,647	1.21
Ploughing	118,534	24.09
Planting	59,870	11.95
Planting fertilizer	23,523	4.95
Top dressing	1,033	0.19
Manure application	7,018	1.47
Pesticides	16,205	3.05
Fungicides	17,943	4.04
Herbicides for weeding	840	0.14
Weeding	62,708	12.85
Harvesting	77,751	16.40
Threshing	-	-
Winnowing	-	-
Transporting	109,929	9.51
Total cost of labour	**514,367**	**92**

Production and revenue	
Yield (kgs)	5,341
Value (UGX/kgs)	604
Total Revenue (UGX)	**3,223,709**

Profit per acre (UGX)	**1,597,231**
Return per labour day (UGX) *Revenues – input costs / labour days*	**22,900**
Unit cost of production *(UCP = TCP (UGX) / TY (Kgs))*	**304.55**

Figure 4 Potatoes, distribution of revenue per acre

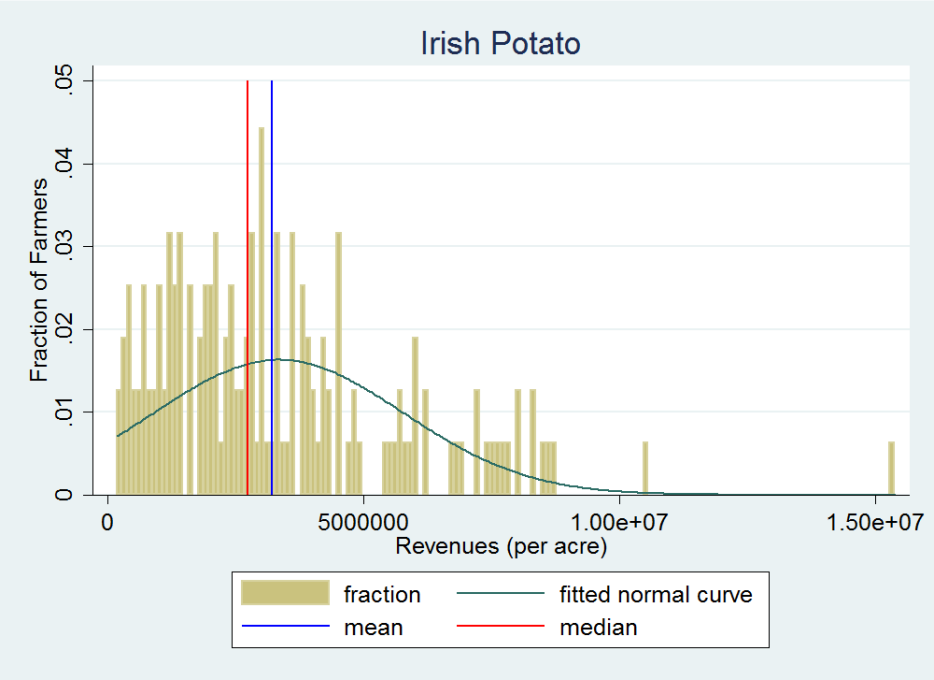


Figure 5 Potatoes, distribution of revenue minus input costs (excl. labour) per acre

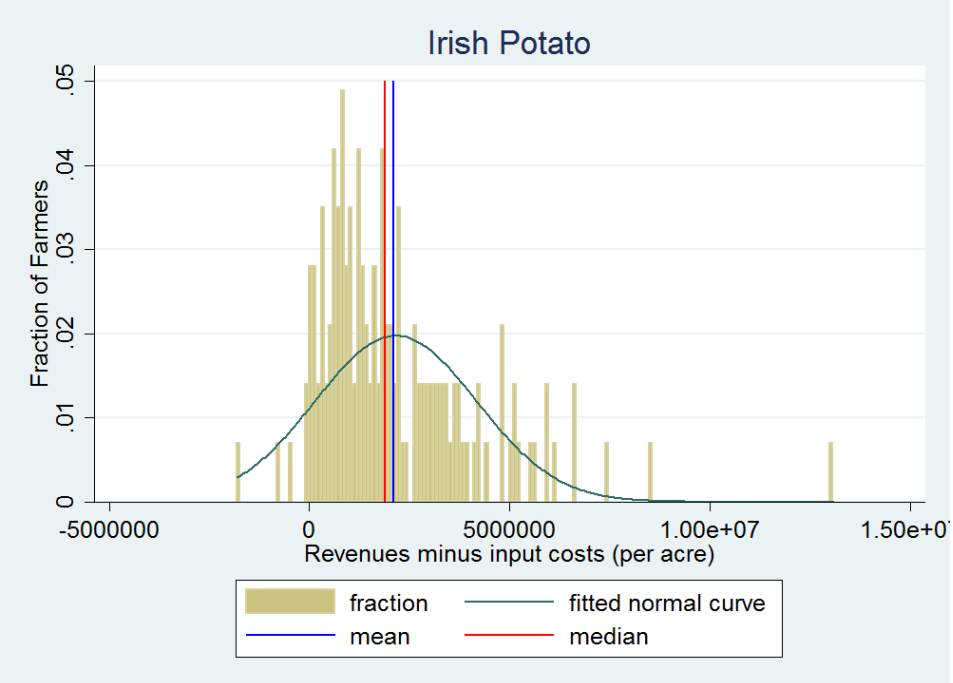
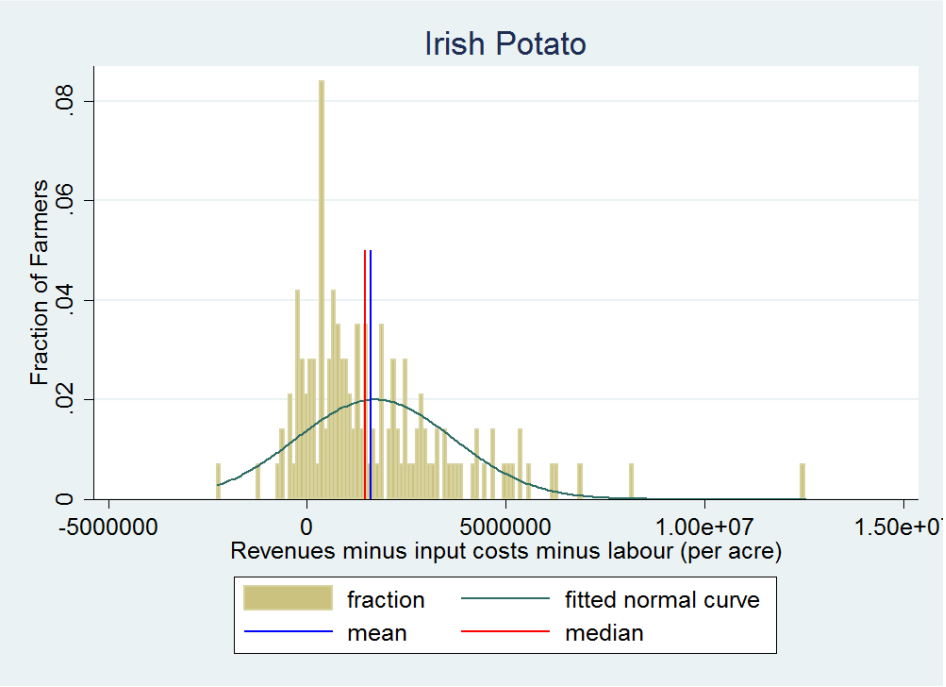


Figure 6 Potatoes, distribution of profit per acre



Regression analysis

The following regression analysis shows the extent to which certain variables influence farmer yield per acre. This finds that the amount of land used for potatoes is highly significant and negatively correlated: potato farmers on larger land sizes have lower yields per acre. For every additional acre the yield is 1534kg lower on average. This trend is not uncommon among smallholders as the larger land sizes tend to be given less attention and labour, and less inputs such as fertilizer because they become too expensive for the farmer to afford. This leads to lower yields per acre for larger smallholders. Do note that larger smallholders may be using correct inputs on some of their land and not all of it.

Total labour days is significant at the 10% level, which gives reasonably strong confidence that this finding is not due to chance. It finds that the marginal increase per additional labour day is 14.65kg higher yield. This is also a common trend: as farmers work more diligently in the field (eg better quality ploughing, weeding, input application etc.) the higher the yield.

There is a strong correlation between planting fertilizer and yields, highly significant at the 1% level. For every additional kilogramme of fertilizer applied, there was found to be a marginal return of 17kgs of potato yield.

Finally, selective herbicides (used for land clearing) were found to be having a significant and positive correlation with yield. However, it is noted that only 7 respondents reported using selective

herbicides, so while the correlation is significant caution should be urged before reading too much into this.

Table 25 Potatoes, regression analysis, dependent variable yield per acre

	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Land used for potatoes (acres)	-1534.69	444.02	-3.46	0.00***	-2414.30	-655.08
Total labour days (per acre)	14.65	7.67	1.91	0.06*	-0.54	29.85
Top dressing used	-105.39	1221.13	-0.09	0.93	-2524.43	2313.66
Herbicides used for land clearing (amount, litres)	-64.51	140.82	-0.46	0.65	-343.47	214.46
Planting fertilizer used (amount, kgs)	17.07	3.95	4.32	0.00***	9.25	24.89
Pesticides used (amount, litres)	-37.93	203.78	-0.19	0.85	-441.62	365.76
Fungicides used (amount, kgs)	102.95	66.40	1.55	0.12	-28.59	234.48
Selective herbicides used (amount, litres)	1249.39	339.57	3.68	0.00***	576.71	1922.07
Seed used (amount, kgs)	0.56	0.54	1.04	0.30	-0.50	1.63
Row planting done	765.21	1352.73	0.57	0.57	-1914.53	3444.96
Crop rotation done	-667.16	1030.38	-0.65	0.52	-2708.33	1374.00
Intercropping done	-58.46	784.24	-0.07	0.94	-1612.03	1495.12
[control] district_coded	2239.90	626.34	3.58	0.00***	999.12	3480.69
_cons	2315.47	1741.22	1.33	0.19	-1133.88	5764.81

**** significant at 1% level, ** 5% level *10% level*

Annex 3 - Rice, Eastern Uganda

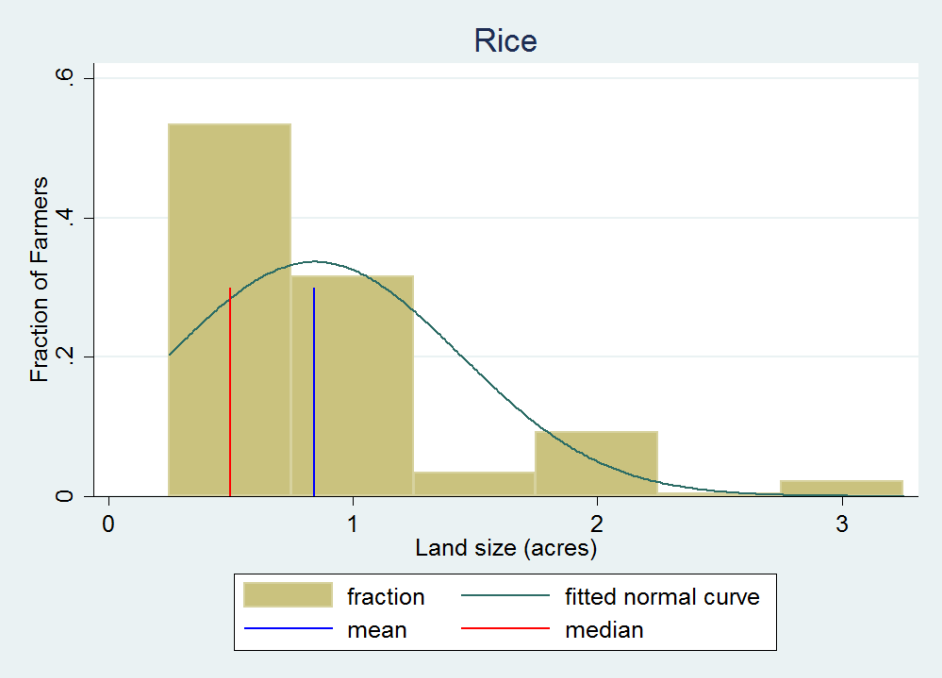
Land

Table 26 Rice, land mean size (acres)

	Acres
Total, all land cultivated	2.44
Total owned	2.16
Total leased	0.75
Total borrowed	0.03
Land used for rice	0.83
Of this…Land owned	0.41
Land leased	0.41
Land borrowed	0.00
Land communal	-

Note farmers may own more land than is cultivated (e.g. lying fallow or leased out to other farmers)

Figure 7 Rice, land size distribution (acres)



Production practices

Table 27 Rice, production practices

Production practice	Paddy rice	Baseline	Change
Land clearing done at start of season	86%		
Land clearing, herbicides used	43%	17%	+26
Ploughing, tractor used	0%		
Ploughing, animal traction used	21%		
Ploughing, manual ploughing done	91%		
Bunds used	76%		
Seed purchased	74%	42%	
Planting done in rows	90%		
Planting fertilizer used	63%	24%	+39
Top dressing fertilizer used	69%		
Manure used	22%		
Pesticides used	86%	24%	+62
Fungicides used	36%	-	-
Herbicides used	11%		
Crop suffered from diseases last season	35%		
Threshing done	100%		
Winnowing done	99%		
Crop rotation done	0%		
Intercropping practiced	0%		
Paddy rice is milled	98%		

Table 28 Rice, mean quantities of inputs used per acre

	KGs/litres
Herbicides for land clearing	0.69
Planting fertilizer	10.50
Pesticides	1.32
Fungicides	0.73
Herbicides for weeding	0.21
Seed	10.73

Labour

Table 29 Rice, labour types used

Labour type	Paddy rice
Household labour used	97%
Hired labour used	96%
Communal labour used	40%

Table 30 Rice, labour days per acre

	All labour	Household	Hired	Communal
Land clearing	7.11	1.32	4.20	1.15
Herbicide application for land clearing	1.40	0.54	0.65	0.17
Ploughing	28.03	6.65	13.64	4.67
Planting	15.38	3.33	8.92	2.91
Bird scaring	54.35	10.90	42.90	0.13
Planting fertilizer application	3.15	1.28	1.09	0.72
Topdressing application	2.88	1.47	0.92	0.48
Manure	0.85	0.56	0.20	0.08
Pesticide application	2.51	1.14	1.10	0.15
Fungicide application	0.82	0.40	0.41	0.01
Herbicide application (selective)	0.28	0.09	0.16	0.03
Weeding	16.81	6.04	8.23	2.37
Harvesting	9.32	1.27	6.25	1.56
Threshing	6.69	1.01	4.39	1.14
Winnowing	5.17	1.68	2.86	0.63
Transporting to store	4.25	0.14	3.92	0.19
Total labour days	**158.98**	**37.83**	**99.83**	**16.38**

Note: Labour day data uses data within 3 standard deviations of the mean (removing outliers) and has been checked for accuracy against described days by participants in the focus group participatory budgeting exercise. Note also that bird scaring is an activity that uses labour at a much lower cost than all other activities and would sometimes not be counted in other studies. The total labour days without bird-scaring is 104.63.

Table 31 Rice, labour share, household, hired, communal

variable	Household share	Hired share	Communal labour share
Land clearing	25%	56%	16%
Herbicide application for land clearing	38%	47%	15%
Ploughing	26%	53%	19%
Planting	21%	48%	28%
Bird scaring	20%	79%	0%
Planting fertilizer application	45%	33%	22%
Top dressing application	47%	29%	23%
Manure application	69%	23%	9%
Pesticides application	46%	48%	6%
Fungicide application	49%	50%	1%
Herbicide application for weeding	47%	38%	16%
Weeding	35%	45%	18%
Harvesting	14%	67%	19%
Threshing	17%	65%	18%
Winnowing	31%	57%	11%
Transport	3%	92%	5%
Total	25%	61%	13%

Table 32 Rice labour share, male and female

	Household labour		Hired labour	
	men	women	men	women
Land clearing	75%	25%	95%	5%
Herbicide application for land clearing	78%	22%	98%	2%
Ploughing	47%	53%	69%	31%
Planting	50%	50%	73%	27%
Bird scaring	73%	27%	100%	0%
Planting fertilizer application	57%	43%	85%	15%
Top dressing fertilizer application	59%	41%	90%	10%
Manure	57%	43%	87%	13%
Pesticides application	78%	22%	97%	3%
Fungicides application	82%	17%	97%	3%
Herbicides weeding application	80%	20%	100%	0%
Weeding	46%	54%	53%	47%
Harvesting	47%	53%	76%	24%
Threshing	54%	46%	84%	16%
Winnowing	26%	74%	18%	82%
Transport	86%	14%	99%	1%
Average	**62%**	**38%**	**83%**	**17%**

Table 33 Rice, labour, daily rates

	men	women	weighted avg
Land clearing	7,041	2,841	6,823
Herbicide application for land clearing	7,175	2,667	7,091
Ploughing	7,544	5,774	6,995
Planting	8,072	6,727	7,715
Bird scaring	1,982	-	1,982
Planting fertilizer application	5,345	3,034	5,000
Top dressing fertilizer application	5,786	1,702	5,360
Manure application	6,759	2,485	6,189
Pesticides application	7,036	2,235	6,901
Fungicides application	6,176	-	6,023
Herbicide application for weeding	5,750	-	5,750
Weeding	6,071	5,787	5,937
Harvesting	10,602	7,894	9,959
Threshing	11,128	7,179	10,479
Winnowing	6,039	3,378	3,848
Transport	14,070	9,597	14,006

Table 34 Rice, mean yield (acres) and price (UGX)

	Value	Baseline	National
Yield rice (kgs/acre)	1,597	648	631
Yield standard error +/-	44		
Price	1,518		

Marketing

Table 35 Milled rice, marketing sources

Marketing	Milled rice
% of respondents marketing at least some of the crop	97%
Local market	1%
Villagers	0%
Company	1%
District market	0%
Traders and brokers	91%
Government buyer	0%
Farmer cooperative	3%
Other place sold to	2%

Training

Table 36 Rice, training received and sources

Training	paddy rice
% of respondents who have received training	97%
Government	8%
Company	4%
NGO (inc. IFDC)	96%
Research institute	0%
Farmer organisation	0%
Model farmer	3%
Other	0%

Table 37 Rice, training types received

Training types	Paddy rice
Use of improved seeds and planting materials.	96%
Line planting and crop spacing	96%
Fertilizer usage	95%
Herbicide usage	93%
Soil, water and nutrient conservation	90%
Pests and diseases management	93%
Post-harvest handling	90%
Storage	90%
Record keeping	89%
Group formation	87%
Marketing	88%
Village savings and loans (VSLAs)	85%
Other	7%

Credit

Table 38 Rice, savings and credit

	Paddy rice
% of households with a bank account	29%
% of households in a VSLA group	80%
% of households borrowing money last year	43%

Farmer challenges

The following describes farmer's challenges related to rice as recalled in a number of focus group discussions. After recalling about 5-7 challenges that they faced, farmers were then asked to rank these challenges from 1 (biggest challenge) to 5 (5th biggest challenge). Men and women 'broke out' to discuss this ranking separately, but their responses were found to differ little. For the analysis, the rankings given by each group were given a score so that they could be compiled. When a challenge was ranked in the top 5 challenges by a group it was given 5 points + 1 point per rank. So a challenge ranked as the biggest was given 10 points, whereas a challenge ranked 5th was given 6 points.

Table 39 Rice, farmer challenges

Challenge	Score	Summary description
Irrigation	32	All groups: Water control a big challenge even in Doho - uneven flow through channels and furrows, lack of gates; Tororo lack of scheme
Roads	24	Most groups: very poor access remains in rainy season, affecting distances to carry, frequency of buyers
Tarps	13	
Milling	10	
Marketing	10	

Farm model and unit cost of production

Table 40 Rice, farm model, mean input costs, labour costs, revenues and profit per acre

Input costs	Value (UGX)	Kgs/litres
Herbicides for land clearing	9,715	0.69
Animal ploughing	19,906	
Seed (including transport)	4,769	
Planting Fertilizer	22,673	95.26
Pesticides	14,920	1.09
Fungicides	5,412	3.15
Herbicides for weeding	4,151	0.14
Transport	54,416	
Transport to mill	21,341	
Milling	94,895	
Total cost of inputs	**252,199**	

Labour costs	**Value (UGX)**	**Days**
Land clearing	42,350	7.11
Herbicides for clearing	9,075	1.40
Ploughing	164,727	28.03
Planting	114,418	15.38
Bird scaring	102,332	54.35
Planting fertilizer	14,069	3.15
Top dressing	13,118	2.88
Manure application	4,355	0.85
Pesticides	15,221	2.51
Fungicides	4,613	0.82
Herbicides for weeding	1,443	0.28
Weeding	98,396	16.81
Harvesting	87,334	9.32
Threshing	65,684	6.69
Winnowing	20,487	5.17
Transporting	59,275	4.25
Total cost of labour	**816,897**	**159**

Production and revenue		
Yield paddy rice (kgs)	1,597	
Value (UGX/kgs)	*Paddy not sold*	
Milled (kgs)	914	
Value Milled (UGX/kgs)	1,722	
Total Value (UGX)	**1,574,123**	

Profit	**505,027**	
Return per labour day	**12,634**	*Labour days for bird-scaring excluded*
Unit cost of production	**669.49**	

Return per labour day: Revenues – input costs / labour days; Unit cost of production: (UCP = TCP (UGX) / TY (Kgs))

Figure 8 Rice, distribution of revenue, per acre

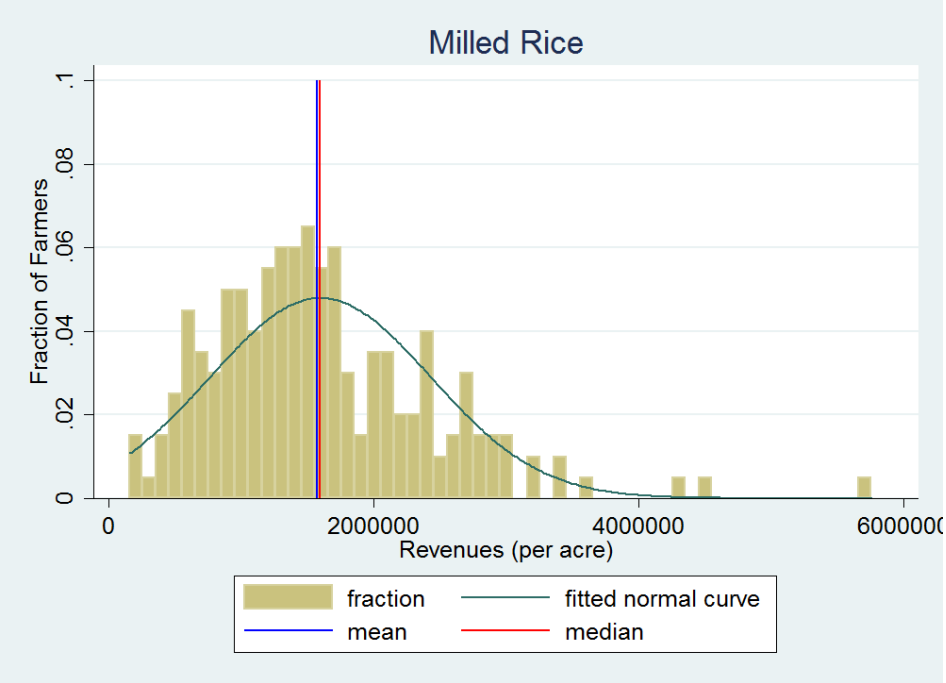


Figure 9 Rice, distribution of revenue minus input costs (excl. labour) per acre

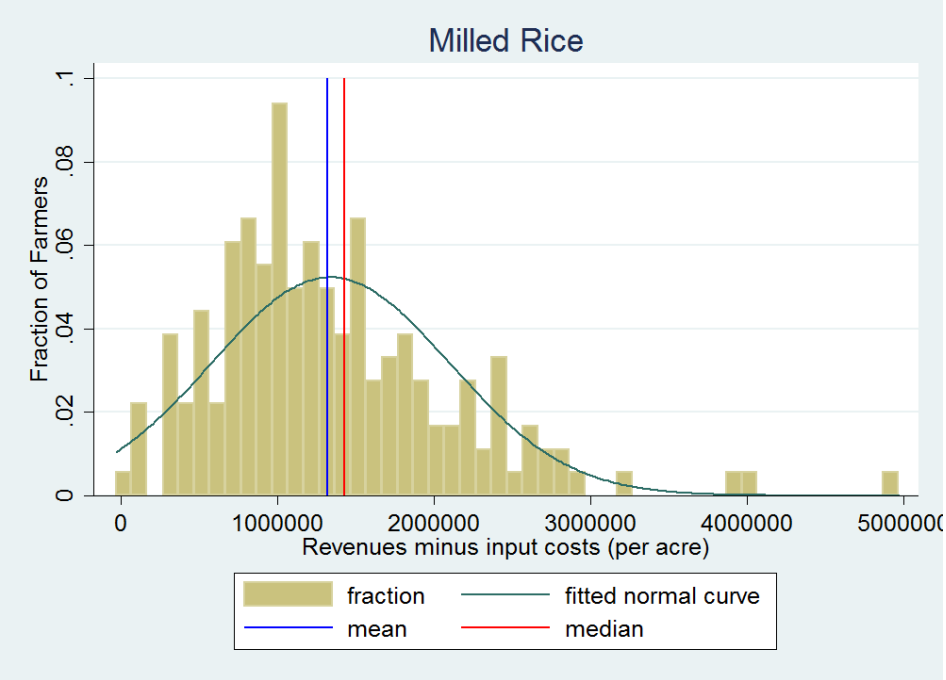
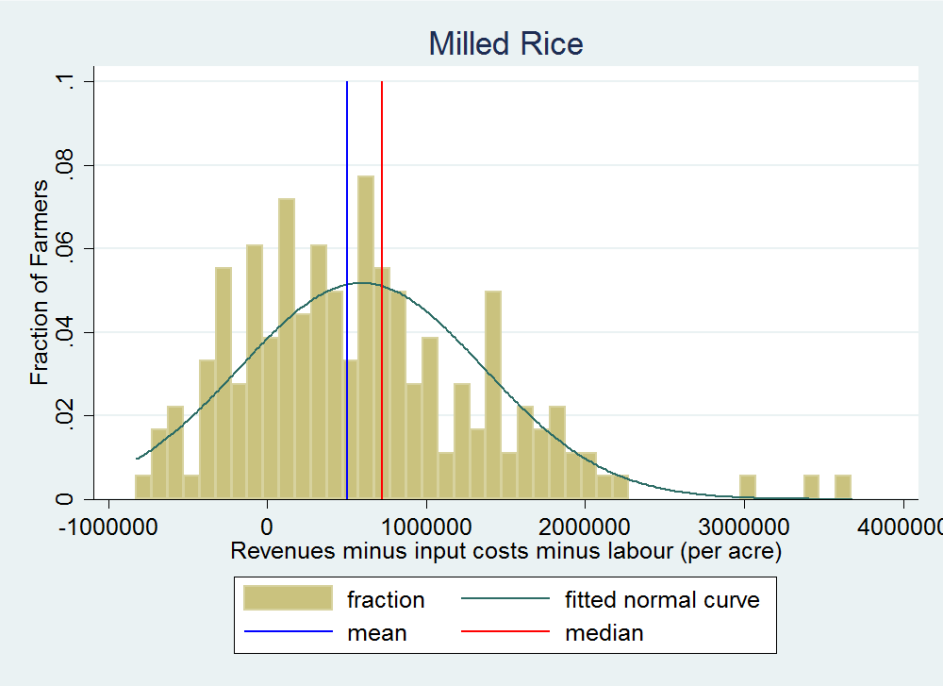


Figure 10 Rice, distribution of profit per acre



Regression analysis

The following regression analysis shows the extent to which certain variables influence farmer yield per acre. This finds that the amount of land used for paddy rice is significant at the 10% level and negatively correlated: paddy rice farmers on larger land sizes have lower yields per acre. (Significance at 10% level is indicative rather than a hard finding). For every additional acre the yield is 159.12 kg lower on average. This trend is not uncommon among smallholders as the larger land sizes tend to be given less attention and labour, and less inputs such as fertilizer because they become too expensive for the farmer to afford. This leads to lower yields per acre for larger smallholders.

Interestingly, selective herbicides (ie used for land clearing) were found to have a positive correlation with rice yields (significant at 10% level). For every litre of herbicides used, marginal yield of paddy rice increased by 105 kgs. This might be explained by the fact that there were fewer weeds in the fields to begin with, allowing transplanted rice to grow well in the early weeks. (Significance at 10% level is indicative rather than a hard finding).

Planting fertilizer was highly significantly correlated with yield at the 1% level. For every additional kg of fertilizer used, marginal yields increased by 14.50 kg.

Row planting (in fact rice transplanting) was found to be significant at the 10% level, achieving yields 299kg higher than those farmers who did not plant in rows.

Table 41 Paddy rice, regression analysis, dependent variable yield per acre

	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Land used for potatoes (acres)	-159.12	96.48	-1.65	0.10*	-349.87	31.64
Total labour days (per acre)	0.94	1.03	0.92	0.36	-1.09	2.97
Top dressing used	177.12	114.23	1.55	0.12	-48.73	402.98
Herbicides used for land clearing (amount, litres)	105.39	56.79	1.86	0.07*	-6.88	217.66
Planting fertilizer used (amount, kgs)	14.50	3.94	3.68	0.00***	6.71	22.30
Pesticides used (amount, litres)	-30.07	33.15	-0.91	0.37	-95.61	35.46
Fungicides used (amount, litres)	-59.80	39.07	-1.53	0.13	-137.05	17.44
Selective herbicides used (amount, litres)	-150.23	92.71	-1.62	0.11	-333.53	33.07
Seed used (amount, kgs)	4.45	3.21	1.38	0.17	-1.91	10.80
Row planting done	299.02	159.09	1.88	0.06*	-15.53	613.57
Crop rotation done	0.00	(omitted)				
Intercropping done	0.00	(omitted)				
[control] district_coded	-96.93	156.79	-0.62	0.54	-406.93	213.08
_cons	1096.72	236.85	4.63	0.00	628.42	1565.02

Annex 4 - Sunflower, Northern Uganda

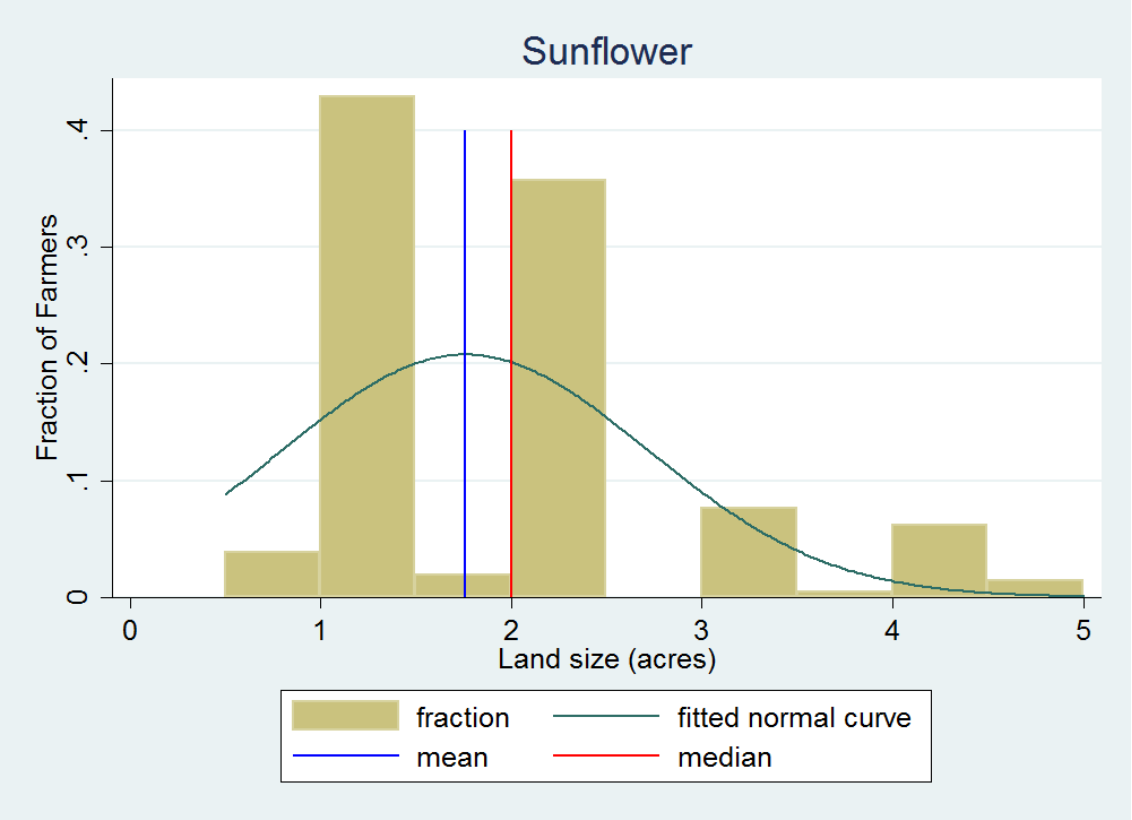
Land

Table 42 Sunflower, land mean size (acres)

	Acres
Total, all land cultivated	4.53
Total owned	3.15
Total leased	1.01
Total borrowed	0.10
Land used for sunflower	1.74
Of this…Land owned	1.14
Land leased	0.46
Land borrowed	0.01
Land communal	0.13

Note farmers may own more land than is cultivated (e.g. lying fallow or leased out to other farmers)

Table 43 Sunflower, land size distribution (acres)



Production practices

Table 44 Sunflower, production practices

Production practice	Sunflowers	Baseline	Change
Land is terraced	0%		
Land clearing	38%		
Land clearing, herbicides used	26%	1%	+25%
Ploughing, tractor used	0%		
Ploughing, animal traction used	72%		
Ploughing, manual ploughing done	51%		
Irrigation	1%		
Seed purchased	93%	68%	+25
Planting done in rows	98%		
Bird scaring done	66%		
Planting fertilizer used	10%	6%	+4
Top dressing fertilizer used	4%		
Manure used	6%		
Pesticides used	7%	6%	+1
Fungicides used	0%	-	-
Herbicides used	2%		
Weeding done	97%		
Crops affected by diseases	26%		
Threshing done	100%		
Winnowing done	100%		
Crop rotation done	91%		
Intercropping practiced	1%		

Table 45 Sunflower, mean quantities of inputs used per acre

	KGs/litres
Herbicides for land clearing	0.33
Planting fertilizer	0.97
Pesticides	0.09
Fungicides	-
Herbicides for weeding	0.03
Seed	2.51

Labour

Table 46 Sunflower, labour types used

Labour type	Sunflowers
Household labour used	97%
Hired labour used	86%
Communal labour used	41%

Table 47 Sunflower, labour days per acre

	All labour	Household	Hired	Communal
Land clearing	4.07	1.72	1.37	0.82
Herbicide application for land clearing	0.40	0.23	1.60	0.02
Ploughing	9.54	3.25	4.43	1.86
Planting	8.36	3.12	3.81	1.42
Bird scaring	14.23	12.91	1.17	0.15
Planting fertilizer application	0.50	0.16	0.30	0.04
Topdressing application	0.09	0.07	2.50	0.00
Manure	0.43	0.29	0.00	0.13
Pesticide application	0.13	0.04	0.05	0.04
Fungicide application	0.01	0.01	0.00	0.00
Herbicide application (selective)	0.08	0.04	0.01	0.03
Weeding	17.95	5.08	8.26	4.62
Harvesting	8.12	3.81	3.01	1.30
Threshing	6.83	2.99	2.50	1.34
Winnowing	3.08	1.31	1.13	0.54
Transporting to store	2.03	1.23	0.64	0.15
Total labour days	**75.85**	**36.26**	**30.78**	**12.48**

Note: Labour day data uses data within 3 standard deviations of the mean (removing outliers) and has been checked for accuracy against described days by participants in the focus group participatory budgeting exercise. Note also that bird scaring is an activity that uses labour at a much lower cost than all other activities and would sometimes not be counted in other studies. The total labour days without bird-scaring is 61.62.

Table 48 Sunflower, labour share, household, hired, communal

	Household share	Hired share	Communal share
Land clearing	40%	36%	24%
Herbicide application for land clearing	46%	34%	20%
Ploughing	27%	46%	27%
Planting	34%	41%	25%
Bird scaring	91%	10%	1%
Planting fertilizer application	27%	47%	27%
Top dressing fertilizer application	73%	27%	0%
Manure application	68%	1%	31%
Pesticides application	30%	41%	29%
Fungicides application	100%	0%	0%
Herbicide application for weeding	53%	12%	35%
Weeding	31%	43%	26%
Harvesting	44%	36%	20%
Threshing	42%	34%	24%
Winnowing	49%	33%	17%
Transport	60%	29%	11%
Total	47%	34%	20%

Table 49 Sunflower, labour share, male and female

	Household labour		Hired labour	
	men	women	men	women
Land clearing	53%	47%	74%	26%
Herbicide application for land clearing	76%	24%	95%	5%
Ploughing	57%	43%	63%	37%
Planting	46%	54%	54%	46%
Bird scaring	58%	42%	92%	8%
Planting fertilizer application	53%	47%	56%	44%
Top dressing fertilizer application				
Manure application	44%	56%		
Pesticides application	56%	44%	86%	14%
Herbicides application for weeding	57%	43%		
Weeding	45%	55%	50%	50%
Harvesting	43%	57%	46%	54%
Threshing	41%	59%	46%	54%
Winnowing	11%	89%	13%	87%
Transport	74%	26%	97%	3%
Average	**51%**	**49%**	**64%**	**36%**

Table 50 Sunflower, labour, daily rates

	men	women	weighted avg
Land clearing	3,850	2,933	3,608
Herbicide application for land clearing	6,370	4,583	6,288
Ploughing	4,200	2,087	3,427
Planting	3,923	3,528	3,742
Bird scaring	2,703	1,040	2,564
Planting fertilizer application	3,227	2,875	3,071
Top dressing fertilizer application	5,000	5,000	5,000
Manure application	-	-	-
Pesticides application	5,143	4,000	4,980
Fungicides application	-	-	-
Herbicide application for weeding	6,000	-	6,000
Weeding	2,541	2,564	2,553
Harvesting	2,710	2,729	2,721
Threshing	2,795	2,785	2,790
Winnowing	3,637	3,237	3,290
Transport	5,901	833	5,740

Table 51 Sunflower, mean yield (acres) and price (UGX)

	Value	Baseline	National
Yield (kgs/acre)	366	405	400
Yield standard error +/-	13		
Price	862		

Marketing

Table 52 Sunflower, marketing sources

Marketing	Sunflower
% of respondents marketing at least some of the crop	99%
Local market	1%
Villagers	3%
Company	64%
District market	0%
Traders and brokers	26%
Government buyer	0%
Farmer cooperative	7%
Other place sold to	0%

Training

Table 53 Sunflower, training received and sources

Training	Sunflowers
% of respondents who have received training	91%
Government	4%
Company	17%
NGO (inc. IFDC)	86%
Research institute	3%
Farmer organisation	0%
Model farmer	0%
Other	1%

Table 54 Sunflower, training types received

Training types	Sunflower
Use of improved seeds and planting materials.	86%
Line planting and crop spacing	88%
Fertilizer usage	85%
Herbicide usage	80%
Soil, water and nutrient conservation	68%
Pests and diseases management	80%
Post-harvest handling	79%
Storage	83%
Record keeping	78%
Group formation	76%
Marketing	74%
Village savings and loans (VSLAs)	79%
Other	3%

Credit

Table 55 Sunflower, savings and credit

	Sunflowers
% of households with a bank account	35%
% of households in a VSLA group	92%
% of households borrowing money last year	52%

Farmer challenges

The following describes farmer's challenges related to sunflower as recalled in a number of focus group discussions. After recalling about 5-7 challenges that they faced, farmers were then asked to rank these challenges from 1 (biggest challenge) to 5 (5th biggest challenge). Men and women 'broke out' to discuss this ranking separately, but their responses were found to differ little. For the analysis, the rankings given by each group were given a score so that they could be compiled. When a challenge was ranked in the top 5 challenges by a group it was given 5 points + 1 point per rank. So a challenge ranked as the biggest was given 10 points, whereas a challenge ranked 5th was given 6 points.

Table 56 Sunflower, farmer challenges

Challenge	Score	Summary description
Seed	27	Serious lack of access, agent bumping prices; adulteration, germination
Marketing	21	Lack of power to negotiate prices, partly due to agents, but also infrast linkages, low capacity of groups, storage
Herbicides	13	
Roads	12	
Storage	10	
Spray pumps	8	

Farm model and unit cost of production

Table 57 Sunflower, farm model, mean input costs, labour costs, revenues and profit per acre

Input costs	Value (UGX)	Kgs/litres
Herbicides for land clearing	5,399	0.33
Animal ploughing	49,619	
Seed (including transport)	35,904	
Planting Fertilizer	2,071	95.26
Pesticides	788	1.09
Fungicides	29	3.15
Herbicides for weeding	271	0.14
Transport	2,499	
Transport to mill	-	
Milling	-	
Total cost of inputs	**96,580**	
Labour costs	**Value (UGX)**	**Days**
Land clearing	13,583	4.07
Herbicides for clearing	2,470	0.40
Ploughing	32,009	9.54
Planting	31,162	8.36
Bird scaring	29,476	14.23
Planting fertilizer	1,523	0.50
Top dressing	444	0.09
Manure application	7,899	0.43
Pesticides	656	0.13
Fungicides	-	0.01
Herbicides for weeding	293	0.08
Weeding	45,821	17.95
Harvesting	22,095	8.12
Threshing	19,052	6.83
Winnowing	9,763	3.08
Transporting	10,235	2.03
Total cost of labour	**226,483**	**76**
Production and revenue		
Yield (kgs)	366	
Value (UGX/kgs)	604	
Milled		
Value Milled (UGX/kgs)		
Total Value (UGX)	**221,091**	
Profit (UGX)	**-101,972**	
Return per labour day *Revenues – input costs / labour days*	**2020**	*Excludes bird scaring*
Unit cost of production *(UCP = TCP (UGX) / TY (Kgs))*	**882.02**	

Figure 11 Sunflower, distribution of revenue per acre

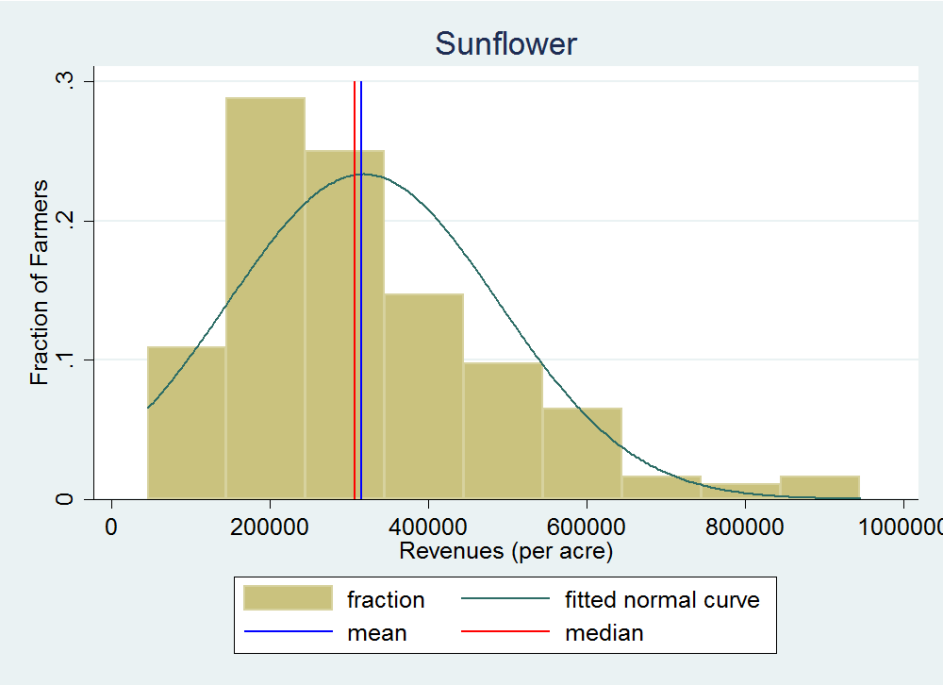


Figure 12 Sunflower, distribution of revenue minus input costs (excl. labour) per acre

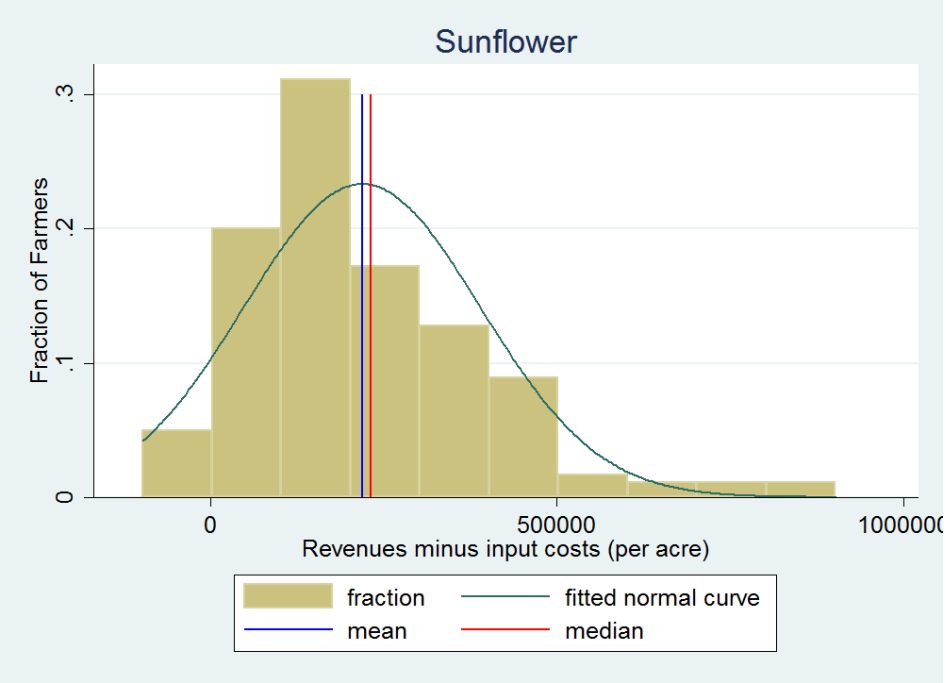
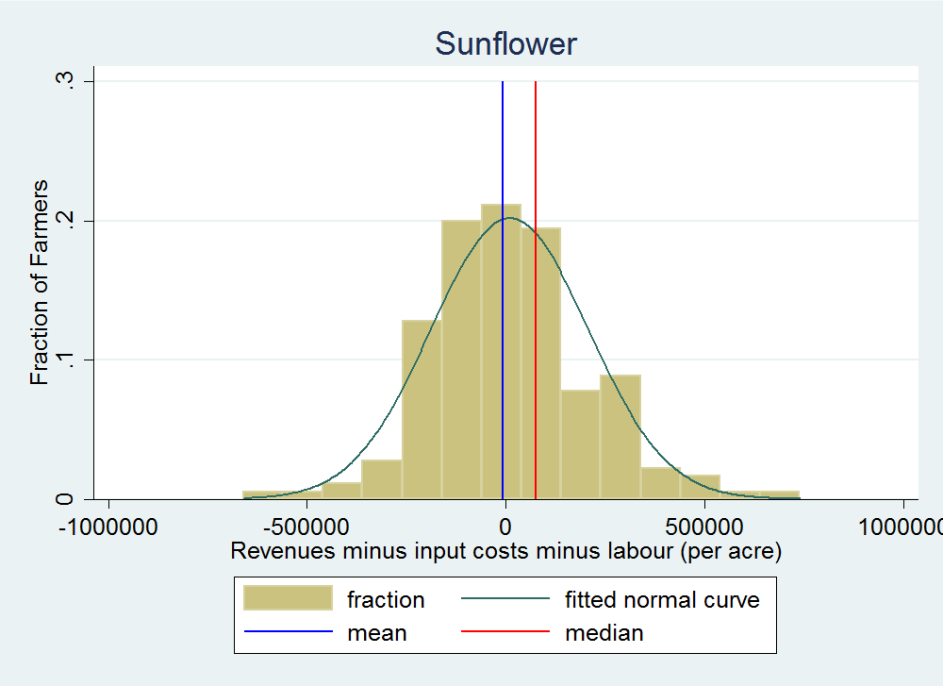


Figure 13 Sunflower, distribution of profit per acre



Regression analysis

The following regression analysis shows the extent to which certain variables influence farmer yield per acre. This finds that the amount of land used for sunflower is highly significant and positively correlated: Sunflower farmers with larger land sizes have higher yields per acre. For every additional acre the yield is 47.89kg higher on average. This is interesting because it is the opposite to what was being experienced in the potato and rice areas. The reason might be because greater land size is acting as a proxy for wealth, but also because other variables which would normally explain differences in yield (ie chemical inputs) were not frequently used in the north.

The amount of seed used was significant at the 10% level, with each additional kg of seed planted yielding an additional 15.68 kgs of sunflower. However, it should be noted that this doesn't represent good value, as an additional kilogramme of sunflower (~30000 UGX) seed is worth about three times more than 15.68 kilogrammes of sunflower (<10000 UGX).

In short, the regression analysis for sunflower shows up very few variables influencing yield precisely because few farmers are correctly using inputs.

Table 58 Sunflower, regression analysis, dependent variable yield per acre

	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Land used for potatoes (acres)	47.89	17.25	2.78	0.01	13.79	81.98
Total labour days (per acre)	0.73	0.51	1.44	0.15	-0.27	1.74
Top dressing used	-38.92	84.36	-0.46	0.65	-205.71	127.87
Herbicides used for land clearing (amount, litres)	18.28	21.22	0.86	0.39	-23.66	60.23
Planting fertilizer used (amount, kgs)	-0.28	4.84	-0.06	0.95	-9.86	9.29
Pesticides used (amount, litres)	-16.71	48.39	-0.35	0.73	-112.38	78.96
Fungicides used (amount, kgs)	0.00	(omitted)				
Selective herbicides used (amount, litres)	-73.51	57.99	-1.27	0.21	-188.17	41.15
Seed used (amount, kgs)	15.68	9.34	1.68	0.10	-2.79	34.15
Row planting done	-65.78	96.52	-0.68	0.50	-256.60	125.04
Crop rotation done	36.49	51.60	0.71	0.48	-65.52	138.51
Intercropping done	0.00	(omitted)				
[control] district_coded	-14.40	31.87	-0.45	0.65	-77.40	48.59
_cons	219.52	107.33	2.05	0.04	7.32	431.72

Annex 5 – Conflicts in the Wetlands

The question of wetland conflicts in the eastern region was sensitively asked about in all focus groups. Only one group (name withheld) in the Kachongo sub-county of Butaleja had experienced conflicts.

There is a 'big man' (name withheld) who in Amins time was granted a large swathe of prime land (180 hectares). Subsequent governments do not recognise his claim, and the government has tried to sensitise him that the wetlands are for all people. But the man is still fighting for the land through the courts and other means. The government advised him to record all his expenses and file for compensation but apparently he has refused this. The conflict has taken various forms:

Back in 1994 some villagers were arrested by police while working their fields. They paid bail of 100,000 UGX at the time, and each year, for 20 years, they are summoned to court in early April along with village representatives. These men are the defendants on behalf of the whole village and neighbouring villages. Apparently the first judgement was found in the favour of the villagers, but the man appealed the case and has managed to keep it alive thereafter using various strategies of influence. "He tries to confuse everyone and we are sent home and told later when to come back". Strategies include paying money to influential people (allegedly government officials, including the residence district commissioner, and five local council executives), and paying off lawyer of the villagers so he abandoned their case. The villagers feel that the new lawyer assigned to them is not representing them sufficiently well.

More aggressive tactics have also been used. He has threatened the villagers in various ways. In 2005 he is said to have brought in people from the other towns with clubs, pangas and ropes to attack the villagers. The villagers fought back and called the police who arrested some while others fled, but no one was charged. There were some injuries but fortunately no one was killed.

Last month he again came with men to the other side of the village and started ploughing. He brought prisoners to cultivate on the other side of the village and prison guards supervised with guns. The villagers also moved there to head him off from ploughing their lands with some success for now.

The villagers are at a loss as to what to suggest to resolve this situation. For example, they suggest that the reviewer talks with the Minister of Land and if possible the Prime Minister. Apparently some ministers know about this case as well as the Attorney General.

It is suggested that if IFDC wants to assist the villagers, and if their case is as strong as they say it is, then an intervention idea would be to set up a legal fund for the villagers. However, this is likely outside the scope of the CATALIST-Uganda programme. Clearly these smallholders are fighting against money and influence, and the villagers are unable to afford the kind of legal representation that will fight for them and bring closure to this issue.