

## Scaling Smallholder Farmer Empowerment: Lessons from the Lifelong Learning Program in Uganda

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**Abstract:** An evaluation study of the Lifelong Learning for Farmers (L3F) program was undertaken in two sites; in the central and northern regions of Uganda. Propensity Score Matching (PSM) was used to measure the impact of the program on crop and household income, as well as the empowerment levels of its participants. The two sites had differences not only in geographical location but in historical background and implementation of the program, which may have influenced the livelihood outcomes. Despite these differences, the results of the study confirm the potential of the L3F approach to raise participants' crop and household income relative to non-L3F counterparts, significantly so for women participants. There is also sufficient evidence to confirm that L3F positively contributes to farmer empowerment, and, subsequently, their livelihood. The paper draws lessons for scaling the empowerment process using the lifelong learning for farmers' model in Uganda.

**Keywords:** lifelong learning for farmers, empowerment, Propensity Score Matching, Uganda.

### Introduction

There is a wide and growing interest in transformative empowerment as a means of poverty reduction in agricultural development. True empowerment enables farmers to make decisions that result in transformation of their farming systems with a higher degree of productivity, efficiency, sustainability, and inclusiveness (Bartlett, 2008). The Lifelong Learning for Farmers (L3F) program was developed and has been supported by the Commonwealth of Learning (COL), to empower farming communities (Carr, et al, 2015), towards the same goals for transforming the agriculture sector in developing countries. The L3F approach focuses on linking three types of capital: social, human, and financial capital. Integration of these three types of capital helps in removing the barriers to the agricultural development process. Human capital under the Lifelong Learning for Farmers model is viewed as learning, knowledge acquisition, reflective practices, skills and competencies that enhance farmer empowerment. Human capital innovations entail human resource outreach and training leveraging the use of learning ICTs. They also entail the use of other technologies for production, irrigation, and value addition, among others, to enable farmers to overcome the barriers they face.

Social capital innovations harness community collective action through creation of social systems, such as innovation platforms, Savings and Credit Cooperatives (SACCOs), Self Help Groups (SHGs),



village banks, community banks, and cooperatives. These foster increased benefits and social protection from risks. Social capital also allows for community based interactive learning, although social learning has to be linked to lending for purposes of generating financial capital.

Financial capital focuses on facilitating access to low interest loans to enable farmers to invest in quality inputs, and eventually to access markets. Such access to both input and output markets enhances market inclusion for men and women farmers in the rural areas. The integration of these three forms of capital is believed to have the potential to result in transformative learning that subsequently empowers them to overcome their unique constraints in development (Carr, et al, 2015).

### **Background of the L3F Program in Uganda**

In Uganda, the L3F program was launched during 2009-2010 to test the efficacy of the L3F model in the Kabale district of Uganda. At that time, the program focused on sorghum and potato growers belonging to *Bakiga* communities in selected villages of Kabale, and on the *Batwa* community, whose main economic activity was honey collection from wild forests in Kisoro (Carr et al, 2015). This was meant to enable a social inclusion that would ground the model in the local context. The communities were mobilised, and organised into Self-Help Groups (SHGs) and SACCOs. Various stakeholders were involved for capacity building, technical support and systems management. These included Makerere University, District Local Governments in Kabale and Kisoro (KDLG), the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the National Agricultural Research Organisation (NARO) and the rural farmers as primary stakeholders, among others.

In 2010, the Open Distance Learning Network (ODLN) registered the Agricultural Innovation System Brokerage Association (AGINSBA) as a social enterprise with a mission to empower communities with improved skills, business linkages and e-services for improved access to socio-economic, financial and human capital. ODLN had this specific mandate of powering ICT-based learning among rural agricultural communities. Since then, AGINSBA has been very instrumental in the implementation of L3F in Uganda by generating, processing and providing information through multimedia on agricultural and other related matters. AGINSBA facilitates access to loans for local and other farmers at subsidised rates, and links L3F agricultural activities to government, non-governmental organisations, and the private sector, as partners in improving farmers' livelihoods.

During 2012-2015, the focus was on institutionalising L3F and building the distributed capabilities of L3F partner organizations (Balasubramanian et al, 2015). This was meant to have more organisations participating in the program and, in particular, the formation of SACCOs to enable the communities to get involved in community-based savings and lending. It was felt that SACCOs as social enterprises would enable L3F to scale up in Uganda. Among the achievements of the L3F program during 2012 - 2015 was that 2,000 participants accessed finance, social capital and learning in Kabale district, about 400 personnel of NARO, MAAIF, were trained in gender-sensitive L3F, the National Organic Agriculture Movement in Uganda (NOGAMU) participated in organic certification of products, while Makerere University facilitated capacity building activities. AGINSBA, in turn, launched and registered two SACCOs. At the community level, among the L3F participants, there was an increase in perceived income, and empowerment as compared to non-L3F farmers, over 50% of whom were women (Tenywa, 2019a).

One of the major challenges in agriculture in this region as identified at the onset of this initiative was low capital formation and inaccessibility to agricultural credit. MUARIK through AGINSBA introduced “table banking” as a form of community banking, in which the SHGs came together to participate in saving as well as intra-group and inter-group lending. Community banking is a major element of the L3F that is believed would enable more convenient access to financial credit by rural men and women farmers than commercial banking, thus facilitating access to production inputs to complete the empowerment process. The period from 2015 onwards saw enhanced effort in consolidating government and financial institution linkages and strengthening of SACCOs, partnerships for increased access to credit by L3F SACCOs, and scaling the L3F business model in Uganda.

This paper focuses on the relationship between lifelong learning and the key program indicators, crop and household income arising from the improved access to financial credit and production inputs, and empowerment levels arising from enhanced knowledge sharing and learning of men and women farmers in Uganda. An evaluation study was undertaken in two sites: Masaka district in central Uganda, and selected districts in northern Uganda. These are areas where the L3F program was scaled up from south-western Uganda since 2015. Located in two different geographical locations, and with differences in their historical background, the program was implemented with a different approach in each of the two sites. The results of the evaluation are, therefore, used to draw lessons for a wide range of considerations for scaling up the L3F program in Uganda.

### **Lifelong Learning and Small Holder Farmer Empowerment**

Lifelong learning has a very significant place in developing countries because this is where millions of people do not have access to formal education and their learning is mainly either non-formal or informal (Abiy et al, 2014). It has been richly credited to have tremendous value for such populations in developing countries. According to Ahmed, 2014, it embraces all forms of learning experiences, and helps individuals to engage in purposeful interactions with their environment through the development of their knowledge, skills and critical thinking abilities. Abiy et al (2014) add that it plays an essential role in enabling individuals to adapt to, deal with, new challenges and changes in their own lives and surrounding environment. Mwaseba et al (2009) find lifelong learning to be that transformative learning that leads to significant changes in a participant s’ values and attitudes.

Lifelong learning empowers rural farming communities in a way that challenges the non-formal and informal learning promoted by agricultural extension systems that follow didactic pedagogies (Carr et al, 2015). These extension systems offer a top-down, one-way flow for educating farmers. They focus on the supply of new knowledge from research to farmers rather than providing a mechanism for nurturing the innovative capacity of multi-stakeholders, especially the farmers, to make markets work and address recurrent production and market risks in complex farming systems (Tenywa et al, 2011). In realization of this constraint, Roling (1988) proposed a three-dimensional model that forms the basic premise for an extension approach that can lead to empowerment. The three-dimensional model (consisting of the structure, institution, and process) is elaborated by Carr et al (2015), as the basis for the *lifelong learning for farmers* (L3F) program. The model is perceived to promote interactive learning, and a farmer-centric knowledge management system that can empower farming communities (Carr et al, 2015).

The process of empowering individual men and women farmers is described by Hennink et al (2012) as a process of transformation that enables individuals to make independent decisions and take action on these decisions to make changes in their lives. The lifelong learning initiative supports this view and is premised on the belief that an effective linkage of three types of capital, social, human and financial, can create space in which the capacity of farmers and other value-chain stakeholders can be built. L3F utilises appropriate ODL strategies and ICTs to build capacity among farmers, landless laborers, extension officials and other stakeholders within the agricultural value chains. This model provides them with quality learning opportunities facilitated by appropriate ODL strategies and ICTs, enables them to adopt sustainable agricultural practices, builds their capacity in financial literacy to enhance the performance of financial capital, and enables improved organisational capacity. The expected outcomes of this model include increased crop sales by the participating households, improved household incomes, and overall empowerment of the participating men and women farmers. These form the basis for the evaluation of the L3F program from which lessons for scaling empowerment are drawn.

## **Description of the Study Sites**

### **Masaka District (Central Uganda)**

The L3F program in Masaka was begun in 2015 as an effort to scale up the program in Kabale district in the southwest and Sheema district in the western region. In 2015, farmer profiling and registration on the *m-omulimisa*, a Web-based mobile app, began. This has been a continuous process up to now. The implementation of the L3F program in Masaka took an approach that was similar to that used in southwestern Uganda, although while there was academic leadership in Kabale, in Masaka it was mainly private-sector led. In 2017, the communities and stakeholders were mobilised and organised to form a Bean Innovation Platform (IP) (also called *Ekimeeza kye'bijanjaalo* in the local dialect). The formation of a Bean IP was expected to bring together all stakeholders who would be relevant in the development of the bean value chain. The purpose of forming an IP was to ensure mutual conscientization, and a common understanding of the agenda of each stakeholder on the IP (Carr et al, 2015). It would also enhance provision of technical support especially for production and ensure proper systems management. A number of stakeholders from the private and public sectors joined the Bean IP and each played a fundamental role. The Masaka Microfinance and Development Cooperative Trust (MAMIDECOT), a microfinance organization, joined to offer credit to farmers at low interest rates; the Community Enterprise Development Organisation (CEDO) supplied improved bean seed under a contract farming arrangement and offered training; the Masaka Diocesan Development Organisation (MADDO) offered training, especially to farmers in dairy farming, while the Masaka District Local Government (MDLG) supported the Bean IP with extension services (Tenywa 2019 a, b).

In Masaka District, the Bean IP and hence L3F at the time of the study was functional in three sub-counties: Kyanamukaaka, Kabonera and Mukungwe. The farmers in these sub-counties were organised in SHGs to access extension services and technical support from partners. The farmers were contracted by CEDO to multiply seed so that at harvest, they sold it back to CEDO at an agreed buy-back price. SHGs who needed credit to purchase seed and other inputs such as fertiliser, were able to get it from MAMIDECOT. Financial credit from MAMIDECOT included crop insurance and carried a relatively low interest rate compared to the market rate. It should be noted here that all farmers (L3F and non L3F) who wished to, received credit as cash from MAMIDECOT to spend on inputs of their

choice, while others participated in a contract farming arrangement with CEDO, where the latter provided them with bean seed. These two forms of credit management influenced the outcomes of the program, offering insights for program scaling.

### **Lira-Apac (Northern Uganda)**

The L3F program in northern Uganda was functional in over nine districts surrounding the Lira District. The districts included Lira, Apac, Alebtong, Kole, Kwania, Oyam, among others. These were among the districts that in the recent past received post-conflict relief from international agencies and were at a stage of engaging actively in household income generation activities for poverty reduction. Since 2015, there was effort to mobilise farmers into SHGs using the Village Agent model. This model was one of those characteristics that differentiated the L3F program arrangement in the north from the one in Masaka district. In this model, village agents were identified from among community workers and extensionists in the communities where they resided. Village agents worked as individuals, who were facilitated by development agencies in the region, to offer a service to their communities. They mobilised farmers to form SHGs, and gave basic training on agronomic practices, soil fertility management, sustainable agriculture, and financial literacy among others. The village agents trained the farmers mainly using a face-to-face approach, since a good majority of the farmers were not yet able to use the digital platform. Most village agents, however, could access information from the platform. In this way, village agents were able to generate demand for agricultural inputs by the farmers in the community, before a planting season.

The microfinance institution that was in the village model arrangement in northern Uganda was Microfinance Support Centre (MSC), a government supported institution, with offices in all regions of the country. An agreement was made between the input supplier and MSC for the former to supply the inputs to the farmers, and the latter to pay the supplier. In this arrangement, the farmers were contracted to repay the funds extended to the input supplier, at a relatively low interest rate, and crop insurance. These arrangements were mediated by AGINSBA.

The mobilisation and sensitisation of the farmers in northern Uganda took place between 2016-2018. It was during this period that AGINSBA identified the village agents, and together with institutions involved in extension work such as local government, were given the necessary capacity building. The village agents subsequently went on to sensitise the communities, form groups and conduct various training. The arrangement to acquire inputs using in-kind credit from MSC only began and was effected in the year of the study, 2019. This is because of the difficulty of finding a source of credit in the local context. Mobilisation and profiling of farmers took place at the same time. Farmers were registered on the *m-omulimisa* platform to receive information and be able to interact with experts on the platform.

### **Methods**

In order to establish the relationship between L3F and the key program indicators, an impact evaluation of the program was conducted in the two study sites mentioned above. The study involved a review of relevant literature and project documents, a household survey among L3F participants and non-L3F farmers using a structured questionnaire, a stakeholders' workshop, and key informant interviews.

## Study Area

The selected locations are shown in Figure 1 below.

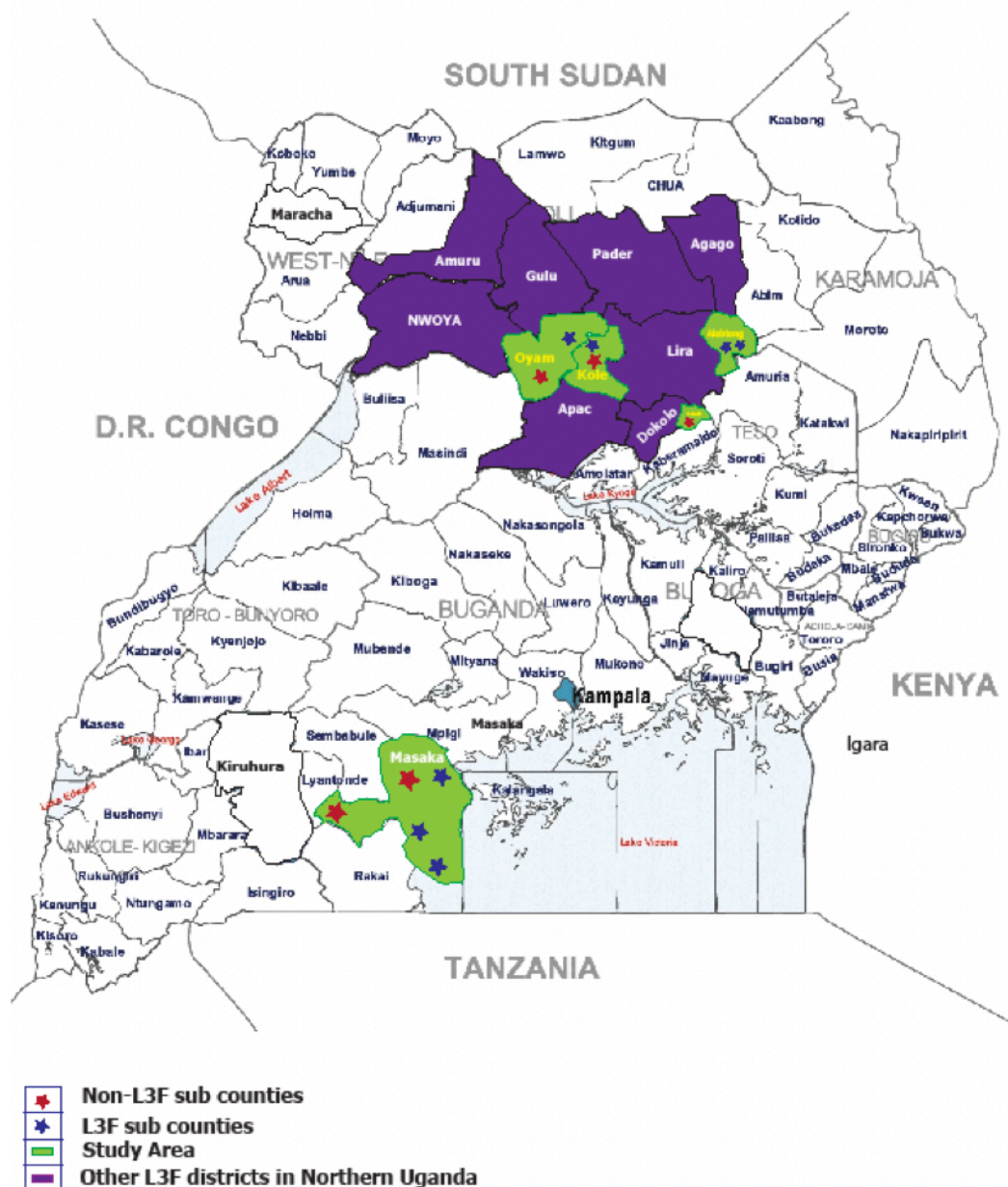


Figure 1: Map of Uganda showing the selected areas for the study

## Sample Selection and Size

Both L3F (henceforth, participants) and non-L3F (henceforth, non-participants) respondents were considered for this study. In order to circumvent the spill-over effects of participation (engaging in L3F activities) to non-participants, the two categories of respondents were selected from different sub-counties. The L3F respondents were randomly selected from the participating sub-counties, and, likewise, the non-L3F respondents were selected from the non-participating sub-counties. While

selecting participating and non-participating sub counties, effort was made to select those that were similar in terms of the geographical location, agro-ecological and socio-economic characteristics. This was important as a way of controlling for many variables, thus ensuring that the difference in the outcome variable between the participants and non-participants was solely due to program participation.

Following Lehr (1992), the formula used in this study to determine the minimum sample size was specified as:

$$n = \frac{32}{Effect\ size^2}$$

where n is the sample size. The effect size is a measure of the effect of the intervention in standard deviation units of the outcome. In this study, our individual randomised trial was designed to detect an effect size of 0.35, which gave us a sample size that is both big and cost effective (Lehr, 1992). The selected effect size gave us a minimum total sample size of 261 individuals for each of the study sites, which made a total sample of 562 respondents for both sites. In the actual sampling, a total of 563 respondents were selected as per the distribution in Table 1 below.

**Table 1: Distribution of sampled respondents by site and sex**

Region	Participants		Non-participants		Total
	Female	Male	Female	Male	
Central	50	68	94	76	288
North	32	106	42	95	275
<b>Total</b>	<b>82</b>	<b>174</b>	<b>136</b>	<b>171</b>	<b>563</b>

## Data Analysis

### *Assessment of Impact of L3F on Crop and Household Income*

The method of Propensity Score Matching (PSM) was used to assess the impact of L3F on crop and household income. In effect, PSM estimates the average treatment effect on the treated (ATT). Given income difference between participants and non-participants ( $Y_d$ ) as an outcome indicator, the average impact of participating in the L3F program on its farmers (referred to as ATT in the impact assessment literature) is defined as the difference between the expected income received by L3F farmers and the expected income difference if they had not joined the program:

$$ATT_d = E(Y_{1d} | p = 1) - E(Y_{0d} | p = 1) \quad (1)$$

where  $ATT_d$  = Average impact of Treatment on the Treated for the income outcome;  $p$  = participation ( $p = 1$  if L3F participating farmer, and  $p = 0$  if non-L3F farmer);  $Y_{1d}$  = income difference of the farmer after joining L3F program;  $Y_{0d}$  = income difference of the same beneficiary if he or she had not joined the program (Caliendo & Kopeinig, 2005).

Propensity Scores (PS) were used to match L3F farmers to non-L3F farmers and hence assess the income difference between the two farmer categories. The PS were predicted using a binary probit regression model that satisfied both the common support<sup>i</sup> condition and the balancing property, not only for the total sample in each region but also for men's and women's samples separately.

### *Estimating and Comparing the Levels of Empowerment*

In order to estimate and compare the levels of empowerment among participants and non-participants, male and female farmers, an empowerment index was estimated using an empowerment module. The index was constructed through a two-step process using factor analysis (FA). The empowerment module had attitudinal questions designed to capture four empowerment indicators (psychological, social, economic and political aspects) at three different levels – household, enterprise and community. There was a set of questions under each level of the empowerment indicators and respondents were asked to respond to the questions by using a seven-point Likert scale, ranging from 0 (strongly disagree) to 7 (agree). In the first step, the responses to the set of questions under each level for each empowerment indicator were combined by FA to generate 12 indices. In the second step, the 12 indices generated in the first step were combined (also using factor analysis) to generate the empowerment index. Indices generated had a big range (0.0049 – 109.481), which makes interpretation difficult. We circumvent this scenario by normalising the indices to a scale of 0 – 100.

## **Results**

### **Descriptive Statistics of the Respondents**

#### *Masaka District (Central Uganda)*

The central region of Uganda is relatively more urbanised, with 50% of the country's 20 largest urban centres (UBoS, 2016) and well resource-endowed in a coffee-banana perennial farming system. In particular, the L3F program in Masaka is functional at the Bean IP. The age and household size of the respondents were not significantly different between the L3F and non-L3F respondents, and neither was women's participation in the survey across the two categories. These statistics are shown in Table 2 below. The acreage of land owned by the respondents was also not significantly different between the L3F and non-L3F respondents. However, a relatively larger percentage of L3F respondents (84.8%) had their main source of income as crop farming, compared to non-L3F respondents (70.8%). This reflects the mission of the L3F program to target rural resource poor farmers involved in crop farming. Although with a few livestock farmers (7.6% of L3F and 12.3% of non L3F respondents), it is therefore not surprising that over 70% of the respondents participated in crop farming as their main source of income, and that the gross cropped land was significantly higher for the L3F than the non-L3F respondents ( $p < 0.05$ ). The education level of the L3F participants was significantly higher than that of the non- participants at the 5% level.



**Table 2: Descriptive characteristics of the respondents in Masaka (Central region)**

	L3F sub-counties	non-L3F sub-counties	
Sample size (N)	118	170	t/chi-sq
	Average or percent	Average or percent	
Age (yrs)	50	48.3	1.081 (0.281)
Household size	7	6.3	1.579 (0.115)
Women	42.40%	55.30%	1.081(0.281)
Education Level (yrs)	8.7	7.6	2.301(0.022)**
Main source of income (crop farming)	84.80%	70.80%	
Land owned (acres)	6.1	3.1	1.575(0.116)
Gross cropped land (acres)	3.1	2.32	2.176 (0.031)**

\*\* Significance at the 5% level (Source: Survey data, October 2019)

When these characteristics are disaggregated by gender, there was neither a significant difference in age nor household size between male and female respondents across both L3F and non-L3F. This further confirms homogeneity across the two categories of respondents. However, a significant difference ( $p < 0.000$ ) in education level was observed between male and female non-L3F respondents, while there was no significant difference between male and female L3F respondents. On average, the L3F respondents were significantly more educated ( $p < 0.05$ ) than their non-L3F counterparts. This finding seems to suggest that in the central region, both men and women farmers, who have attained some level of education, are more likely to join the L3F due to a higher valuation of knowledge than the less educated. In particular the relatively educated women were more likely to participate in L3F than their non-educated counterparts.

### *Northern Uganda*

Northern Uganda, as opposed to the central region, is less urbanised, less resource-endowed, and has an annual crop-based farming system. In the study areas of northern Uganda, the L3F and non-L3F respondents were not significantly different in age, number of women respondents and education level. Both categories had crop farming as a main source of income, as over 80% of them indicated so but the L3F and non-L3F respondents differed significantly in the acreage of land owned, and gross cropped land. The L3F respondents had significantly more of both than the non-L3F respondents (Table 3). Similar to the central region, since the L3F program focuses mostly on crop farming, it is not surprising that L3F respondents should have more cropped land. It is also possible that they participated in the program because they owned enough land to enable their participation.

**Table 3: Descriptive characteristics of the respondents in the northern region**

	L3F sub-counties	non-L3F sub-counties	
Sample size (N)	138	137	t/chi-sq
	Average or percent	Average or percent	
Age (yrs)	42.6	41.2	0.904(0.367)
Household size	7	6	4.835(0.000)***
Women	23.20%	30.70%	1.950 (0.163)
Education Level (yrs)	8	8	0.094(0.925)
Main source of income (crop farming)	92.50%	83.90%	
Land owned (acres)	5.1	3.8	3.079(0.002)***
Gross cropped land (acres)	4.1	3.2	2.728(0.007)***

\*\*\*Significance at the 1% level (Source: Survey data, October 2019)

Gender disaggregation showed that while female L3F respondents, on average, had relatively fewer years of school education (4.7 years), as compared to 5.7 years for the female non-L3F respondents, they also had relatively less cropped land (3.1 acres) compared to their non-L3F counterparts (3.6 acres).

### The Impact of the L3F program on Crop and Household Income

In the northern region, the findings reveal that crop and household incomes of the participants were significantly higher than those of the non-participants, at 10% and 5% levels of significance, respectively, as shown in Table 5. It is also worth noting that women L3F participants had both crop and household income significantly higher than that of their non-L3F counterparts. The male participants also had relatively more crop income than male non-participants, although the finding was not significant.

**Table 5: Effect of L3F participation on crop and household income in northern region**

Outcome	Radius Caliper matching ATT effects		
	Females	Male	Total
Crop income	575,300***	21,000	456,000*
Household income	3,173,300**	-224,000	4,269,000**

(Source: Survey data, October, 2019) \*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% level, respectively

In the central region, results of propensity score matching show that male and female L3F participants obtained relatively more crop and household income than their non-L3F counterparts. These differences were, however, not statistically significant. The results are shown in Table 6 below.

**Table 6: Effect of L3F membership on crop income and household income in central region**

Outcome	Radius Caliper matching (r = 0.005) ATT effects		
	Females	Male	Total
Crop income	71,000	455,100	285,000
Household income	980,000	-137,000	131,100

(Source: Survey data, October 2019) \*\*\*, \*\*, \* denotes significance at 1%, 5% and 10% level, respectively

## Impact of L3F on Farmer Empowerment

### Central Region

Generally, there was a significant impact of L3F on farmer empowerment in the central region. The mean empowerment index for L3F members was 49.6 while that of non-members was 39.6. The difference between the two indices was significant at the 1 percent level ( $t = 2.799$ ,  $p\text{-value} = 0.006$ ). This finding is to be expected based on studies elsewhere (Carr et al, 2015). When disaggregated by gender, the empowerment index for male L3F members (53.7) was significantly ( $t = 1.824$ ,  $p = 0.071$ ) higher than that of female L3F members (44.1). Even among non-L3F members, the empowerment index for males (47.7) was significantly higher than that of their female counterparts (33.4).

Comparing gender variations, the empowerment index for female L3F members was significantly higher than for non-L3F female members ( $t = 2.324$ ,  $p\text{-value} = 0.022$ ). However, the empowerment index for male L3F members was not significantly different from that of non-L3F male members ( $t = 1.162$ ,  $p\text{-value} = 0.247$ ), perhaps due to the availability of off-farm opportunities for non-L3F males in urban areas. These findings reveal that L3F does increase empowerment for both male and female participants but significantly so for female participants. The difference between the empowerment indices of male and female L3F participants is significant at the 10% level, while the difference between the male and female non-L3F respondents is significant at the 1% level. These results are shown in Table 7 below.

**Table 7: Empowerment indices of L3F and non-L3F respondents in the central region**

	Female	Male	t-statistic(p-value)	Mean
L3F members	44.1	53.7	1.824(0.071)*	49.6
Non-members	33.4	47.7	3.146(0.002)***	39.6
<b>t-statistic (p-value)</b>	2.324(0.022)**	1.162(0.247)		2.799(0.006)***
<b>Mean</b>	37.1	50.4	3.882(0.0001)***	

(Source: Survey data, October, 2019); \*\*\*, \*\*, \* denotes significance at the 1%, 5%, and 10% levels respectively

### Northern Region

In the northern region, on the contrary, the findings reveal the reverse. The empowerment index for L3F members was 34.3 while that of non-members was 41.6 and the difference between the two indices was significant at 5 percent ( $t = 2.483$ ,  $p\text{-value} = 0.014$ ) (Table 8). Comparing within group variations, the empowerment index for male L3F members (34.7) was not significantly ( $t = 0.204$ ,  $p = 0.839$ ) different from that of female L3F members (33.8). Even among non-L3F members, the empowerment index for males (41.8) was not significantly different from the females' (41.3).

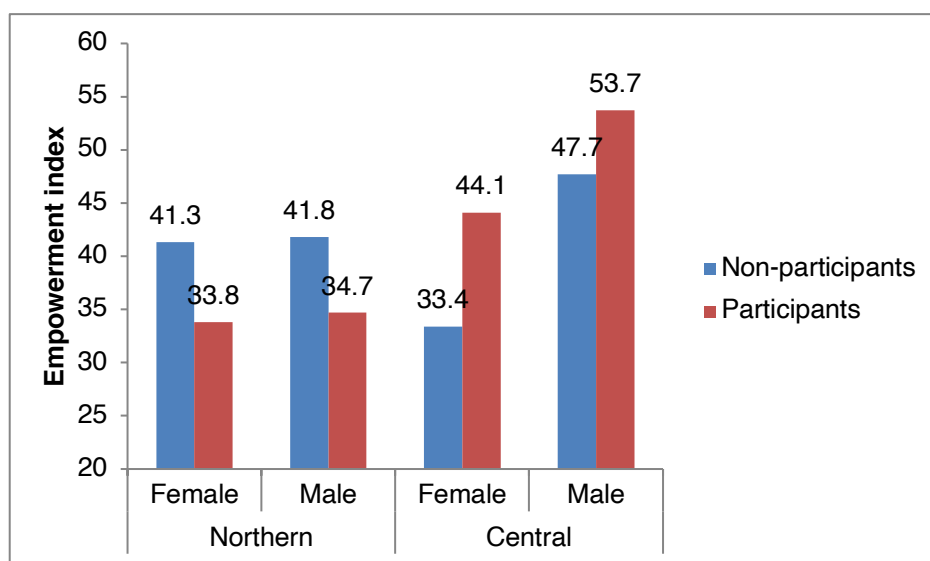
Comparing gender variations, the empowerment index for female non-L3F members (41.3) was higher than for female L3F members (33.8) but the difference was also not significant ( $t = 1.544$ ,  $p\text{-value} = 0.127$ ). However, the empowerment index for male non-L3F members was significantly higher than that of L3F male members ( $t = 1.910$ ,  $p\text{-value} = 0.058$ ).

**Table 8: Empowerment indices of the L3F and non-L3F respondents in Northern Uganda**

	Female	Male	t-statistic (p-value)	Mean
L3F members	33.8	34.7	0.204(0.839)	34.3
Non-members	41.3	41.8	0.103(0.918)	41.6
<b>t-statistic(p-value)</b>	1.544(0.127)	1.910(0.058)**		2.483(0.014)**
<b>Mean</b>	38.0	38.1	0.052(0.959)	

(Source: Survey data, October, 2019); \*\* denotes significance at the 5% level

The empowerment indices of the respondents in the two study regions are further illustrated in Figure 2 below.



**Figure 2: Empowerment indices of the respondents from the two regions**

### Lessons for Scaling Up the Empowerment Process

The characteristics of the respondents in the two regions of the study seem to be quite comparable. In both regions, gross cropped land was more among the L3F respondents than the non-L3F, an indicator of the effort of the program to pursue its objective of enhancing crop production among the participants. Furthermore, the average level of education was higher for men than for women among both L3F and non-L3F respondents. This is also true with the rest of the Ugandan population. The literacy rate is higher for men (77%) than for women (67%) (UBoS, 2016). While the level of education is a factor that has been known to contribute to farmers' participation in development programs such as L3F, and the subsequent empowerment from such programs, women farmers in Uganda have been found to be relatively less educated than their male counterparts (UBoS, 2016).

Without their participation, women farmers often fail to benefit from the empowerment that would ensue from such a program. Bartlett, 2008 advises that facilitating the process of empowerment should involve stimulating the mind through experiential learning, encouraging and supporting observation and experimentation. Such a process should enable women farmers to overcome their fear about their lack of education, which holds them back from participating in development programs. In order to upscale an empowering L3F program to women farmers, the focus of the program on crop production seems to be right to ensure the inclusion of women. Hossain and Jaim (2011) argue that employment and income generation from their farm activities are some of the important elements that bring success in a program for empowering women. Further flexibility and integration of experiential learning in L3F would support women with little or no education at all, and those with small plots of land, to participate in the program.

The results of this study seem to suggest that the L3F program, operating with the village agent model, and coupled with an in-kind credit in northern Uganda has potential to increase crop and household income, significantly so for women participants. In order for this potential to be fully realised, the operations of the village agents and the administration of the in-kind credit ought to be strengthened, by ensuring commitment by MSC, working with *m-omulimisa*, to provide access to loans. The results of the propensity score matching in the two study sites seem to give evidence that the L3F program, albeit in different applications, has the potential to raise participants' crop and household income, and subsequently enhance their livelihood, relative to non-L3F counterparts. However, in the two sites, there were differences in the administration and management of credit, institutional and market inclusion, and human resource development using ICTs.

These differences might be responsible for the differential impact of the program in the two study areas. In northern Uganda, credit was offered in-kind, as explained in Section 1. This practice ensured financial inclusion that was in compliance with the L3F approach of building a disciplined saving culture for community based banking, providing a worthwhile basis for engaging commercial banks in a scaling-up process for L3F. On the contrary however, the method of in-kind credit administration may not be that compliant with the principles of L3F empowerment. Compliance would mean that an individual is enabled to make independent decisions about the use of credit funds, where to buy inputs, and where to sell the output. However, in the socio-economic and geographical circumstances surrounding the northern region of Uganda, it seems plausible to scale up the same intervention to communities in similar situations. Full compliance to the principles of empowerment would be a gradual process as the farmers begin to appreciate the gains in household and crop income arising from this arrangement.

There were other factors that seemed to influence the outcomes on crop and household income in the two applications of L3F. First, financial credit was obtained at a relatively lower interest rate of 13% per annum (pa) in the north, compared to 24% pa in the central region as revealed from personal interviews with the respective service providers. Both were, however, associated with crop insurance provided through the Agricultural Insurance Scheme, a government insurance program. A low interest rate coupled with crop insurance was well appreciated by crop farmers and would most likely provide improvement in livelihoods in any scaling-up process. Secondly, it is worth noting that in both applications, farmers looked for their own markets. Even in Masaka, where there was a possibility for farmers to obtain bean seed from CEDO with a contract to sell the grain back to CEDO

at harvest, farmers were tempted to default on their contracts as they looked for buyers with a better price. During the scaling up of L3F, the design of the program should consider including competitive market actors such as wholesale or bulk buyers of produce, and processors among the institutions to integrate in the program. This would facilitate access to markets especially for women farmers and enhance market inclusion in the program.

Thirdly, the role of a village agent as a facilitator of knowledge exchange and learning, was crucial in the north where farmers were remotely located, and out of reach of most conventional extension service deliveries. L3F farmers nearly depended solely on the guidance of the village agent, more so that the use of ICTs for information sharing was not yet widespread. For L3F farmers' crop and household income performance to be relatively better than their non-L3F counterparts renders credit to the village agents as key facilitators of this approach. In remote locations, therefore, with less resource endowment, the village agent approach appears to be worth scaling up.

The findings on the impact of the L3F program on crop and household income confirm the hypothesis that if rural credit was blended with appropriate capacity building, it could result in improved crop and household incomes. However, an in-depth analysis of the nature of credit at the two sites reveals that, in addition to the difference in the interest rates offered, there were other differences between the two sites that could potentially affect credit performance. The differences between the two sites include whether credit was given in-kind or cash, whether the input procurement process was managed within the arrangement or whether farmers out-sourced inputs by themselves, and how information was accessed and shared, in addition to the specific characteristics of a given location. The key lessons for financial inclusion, therefore, are low or modest interest rates on financial credit, with agricultural crop insurance to reduce the risks associated with crop failure. The scaling-up process will also require a deliberate effort to enable farmers to access markets within any L3F approach.

These findings seem to suggest that during the study period, L3F in northern Uganda could not yet produce the expected positive impact on the empowerment of the participants. There might be several reasons for the seemingly poor performance of the program on empowerment indices in the northern region. First, most of the period between 2015-2019 was spent on mobilising farmers, profiling them and creating awareness about the program. Most other capacity building activities would take place only after this. For example, the financial credit arrangement was effected in 2019, hardly a year after actual implementation. On the contrary, in the Masaka district of the central region, the Bean IP was established in 2017. The key stakeholders of the bean value chain were mobilised, and activities, meetings, training, and organising for credit access, were begun shortly after. By the time of the study, therefore, there was more engagement of the farmers in production than in the north, and hence more visible impact.

Secondly, there are differences in social capital formation between the IP and village model application. In the village agent model, the farmers interact mostly with the village agents. The latter are their main source of information on a number of issues: which crops would be best for the season, where seed will be obtained from, and best agronomic practices. In this model, the farmers rarely engage with other stakeholders in the value chain, on the same platform, like they do in the arrangement in the Masaka district. This is likely to have a delayed effect of the program on their empowerment. An enormous amount of literature alludes to the complexity of the empowerment process with insights as to why the process could fail. Wortmann-Kolundzija (2019) commends the

importance of continued support and guidance from stakeholders, to the implementation of interventions as well as member participation, among other incentives, if full empowerment is to be achieved. In the northern region, the absence of organisations to impart such informational capital was conspicuous, with a possible negative impact on the observed levels of empowerment as compared to the central region. Scaling-up the L3F empowerment would consider involving a number of organisations, value chain stakeholders, and any other actors that would contribute to increasing informational resources in the empowerment process. It is equally important to note that enhanced use of ICTs would fast-track extension service delivery, providing information to wider audiences of farmers in remote and hard-to-reach areas, faster. But ICT use was not active, especially in the north.

Lastly, for the mean empowerment indices of the central region to be relatively higher than the north is not surprising. The central region is likely to be more privileged than the north, in terms of access to information, good markets as a result of its relative proximity to the capital city in Kampala (UBoS, 2016), and a longer period of general political stability. The northern region, at the time of this evaluation, was undergoing livelihood recovery in the post-conflict period (Levine, 2016).

Notwithstanding, the results of the study show that participation in L3F has the capacity to narrow the gap between male and female farmer empowerment.

## **Conclusion**

Although in the early stages, and with different challenges of implementation in the two sites, there is sufficient evidence to confirm that L3F positively contributes to farmer empowerment. The approach of credit being administered in-kind to the farmers by the L3F program seems a plausible starting point to scale an empowerment process for rural communities of poor farmers that are remotely located such as those in northern Uganda. These results confirm the potential of L3F to raise participants' crop and household income, and subsequently their livelihood, relative to non-L3F counterparts, significantly so for women participants. It is also clear that a credit arrangement with a low cost of borrowing, coupled with agricultural crop insurance, is most preferred to boost both financial and social inclusion of the majority of rural farmers. Financial inclusion should be enhanced by leveraging the principles and discipline of community banking to integrate commercial banks in the program. However, commercial banks will be needed for a wider loan portfolio to cover more farming communities. Scaling up of L3F empowerment should also consider involving market actors such as wholesale and other bulk buyers, and processors to open up market opportunities for the participants. This is one of the mechanisms that can support market inclusion, especially for women farmers.

Where a number of organisations are integrated into the approach to provide a variety of services and information, there is clear empowerment of the farmers. This is the direction that a scaling-up process should take. Where it is not possible to integrate a diversity of organisations, the village agent model could be enhanced by facilitating the village agents to cover a wide geographical location and execute their role. The use of ICTs, which was found to be limited in the study sites, should be activated by supporting more farmer registration on to mobile platforms and training more facilitators for e-learning in the farming communities. This has an unexplored potential to scale empowerment in the L3F program in Uganda.

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<sup>1</sup>The common support condition ensures that any combination of characteristics observed in the treatment group can also be observed among the control group (Bryson et al, 2002), hence making matching feasible.