

## **Entrepreneurial Training Amongst Smallholder Farmers in Tanzania: An Assessment of Effect on Farm Productivity**

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### **ABSTRACT**

*This paper sought to assess the effect of smallholder farmers entrepreneurial training and application on farm productivity. It is based on the premise that while some entrepreneurial traits are acquired through birth, some can be learnt and improved through training and can have effect on productivity. The study is based on entrepreneurial training offered by Mount Meru, a sunflower oil processing company in Tanzania in collaboration with an international NGO, RLDC, to sunflower smallholder farmers in Singida and Iramba Districts. A sample of 384 farmers, fifty percent of whom had received training, was drawn using stratified random sampling. Cobb-Douglas Production function was used to estimate productivity based on the key inputs used, including labour and seeds, with a dummy variable of entrepreneurial training included to capture the effect of training. Results show a positive and statistically significant influence of training on productivity, thus confirming to the theoretical argument of role of entrepreneurial training even amongst smallholder farmers. The implication is that in addition to providing technical agronomic skills, small holder farmers should be provided with entrepreneurial training. To make this sustainable it could be incorporated in the extension services provided by the extension staff.*

**Keywords:** Smallholder farmers, Entrepreneur, Sunflower

## 1.0 INTRODUCTION

The main focus of this paper is on assessing the effect of entrepreneurial training on farm productivity amongst smallholder farmers in Singida and Iramba Districts in central Tanzania. Targeted training for smallholder farmers is recognized as important in influencing smallholder farmer behaviour, agricultural productivity and hence incomes and welfare of farmers in the rural economies (Kahan, 2013). While training in agronomical practices by agricultural extension officers focusing on practices for their crops, including adoption of new technologies like improved seeds and fertilizer application has been a dominant type of training (Adhicary, 1994). There have also been numerous studies to assess impact of technological adoption by smallholder farmers on technical efficiency, productivity, and incomes (see for example Mpeta 2014, Ilembu, 2014, Nsimbila, 2014).

Many small farmers are thought to respond spontaneously to new market opportunities. In fact it is recognized that smallholder farmers are private sector operators of small farming enterprises. In this case it can be argued that they are already entrepreneurs in the sense that they seek out profitable opportunity, manage costs of production and marketing, and aspire to grow their business. However, improved education and training can be important as they struggle to adjust to a more commercial and competitive business environment (IFAD 2011).

As discussed below, an entrepreneurial spirit is not endowed, and therefore capacity building in this area becomes important. Basic business skills training is required as a distinct element of farmer education. Recently entrepreneurial training in farming as a strategy to enhance smallholder farmers' business stance and management skills has acquired special emphasis. This is in recognition of the fact that even smallholder farming is a commercial undertaking (Kahan, 2013). Entrepreneurial capacity is assumed to be one of the key determinants of success in business, as well as in any other endeavour such as livelihood improvement (Olomi, 2006; Kahan, 2012; Luyayi *et al.*, 2014).

Many of the agricultural extension officers in Tanzania are trained in typical agricultural institutions, and are therefore technical subject matter specialists. In this case, it is not common for extension workers to provide entrepreneurial training. Recognizing the importance of entrepreneurial skills amongst

smallholder farmers, a number of private sector institutions have taken up the lead to fill this lacuna. Rural Livelihood Development Company (RLDC) and Mount Meru Millers and Mwenge Sunflower Oil Mill have trained smallholder farmers in Singiada in entrepreneurial skills including opportunity identification, risk management, value addition, book keeping, marketing and contract farming (MVIWATA, 2011). This was accompanied by Mount Meru Millers' company making contracts with smallholder farmers to grow sunflower and sell the same to the company on agreed prices. The company supplied improved seeds and extension services (MVIWATA, 2011).

It is of interest to examine if such entrepreneurial training to smallholder farmers is of any consequence. Educators have emphasized formal evaluation of training programmes. Kirkpatrick (1976), for example, suggests four criteria to evaluate training programmes: (1) reaction, (2) learning, (3) behaviour, and (4) results. Each criterion is used to measure the different aspects of a training programme. *Reaction* measures how the trainees liked the programme in terms of content, methods, duration, trainers, facilities and management. *Learning* measures the trainees' skills and knowledge which they were able to absorb at the time of training. *Behaviour* is concerned with the extent to which the trainees were able to apply their knowledge to real field situations. *Results* are concerned with the tangible effects of the training programme on individuals, their job environment, or the organisation as a whole. This paper focuses on the last aspect of result, by assessing the effect of entrepreneurial training on farm productivity amongst smallholder farmers in Singida and Iramba Districts in central Tanzania.

### **Entrepreneurial Trainability: Some perspectives**

While entrepreneurial training is taking pace, there has also been a discourse on whether entrepreneurs are born or can actually be made through training. Some have argued that some entrepreneurs are a special breed, born into this world with a drive and need to succeed that most of humanity lacks and others can be created through education, experience and mentorship (Shane, 2010). Multiple studies have indicated that there may be an "entrepreneur gene"--or at least people with certain genetic characteristics and personality traits that are more likely to make them more successful entrepreneurs than others. Shane (2010) suggests that genes do not just influence whether a person will start a business; they may even

determine how much money a person will earn. In other words, some people are born to be alpha wolves, and the rest will work in the mailroom (Shane, 2010).

Koch and Fisher (2008) argue that entrepreneurs are simply wired that way, giving them a natural advantage in the business world. Lange (2008) indicates that exposure to the ideas and lessons of entrepreneurship can have lasting effects on students, even if they are not "natural" entrepreneurs. In terms of academics, entrepreneurship can be taught and be practiced as well.

Scientific literature suggests that heredity has a good deal to do with personality and behaviour. Some scientists see entrepreneurship as an interaction of heredity and environment (Lange, 2008). It is for this reason that some personalities are much more favourable for entrepreneurship. Personality constrains and influences outcomes. Smallholder farmers bear risks. The experience obtained by doing, knowledge, skills, observation, the environment, and how one is brought up by the parents or guardians also count (Koch and Fisher, 2008). However, it is not easy to teach a person to love to take risks. This seems to be hard-wired in the individual (Koch and Fisher, 2008).

Certain genetically hard-wired individuals do not make it as entrepreneurs, and others do. Genetic literature indicates that up to 60 percent of critical personality characteristics are heritable. Significant portions of personality traits critical to entrepreneurs, like the willingness to take risks and the ability to tolerate ambiguity and uncertainty, are heritable (Koch and Fisher, 2008). A good deal of entrepreneurial behaviour is genetically determined. And in terms of general skills, if they start out with interests or endowments that make them more likely to be entrepreneurs or less likely, their ability can be enhanced to be entrepreneurs through teaching and training.

While it is general agreed that traits are genetically determined rather than learnt and that these can determine entrepreneurial outcomes, yet it has also been established that there are certain traits, for example high level of independence, that can be taught and learned. Experiment done on university students in Canada found that traits can less be learned but that there are certain entrepreneurial skills that are most teachable, including setting goals, developing plan and strong business management skills (Kantor, 1988).

Hisrich *et al.* (2008) argue that education is essential in the upbringing of an entrepreneur. This is because it facilitates the integration and accumulation of new knowledge optimally as it provides individuals with opportunities, and it assists entrepreneurs in adapting to new situations. According to Schulz (1980), education plays a big role in entrepreneurship as it enables the entrepreneur to deal with disequilibrium. On the same token, McCormick (1996) argues that lack or little education constraints individuals from dealing with complex life optimally for wealth creation. According to Global Entrepreneurship Monitor (GEM) report of 2007, low level of education in South Africa contributed to lack of mind set and skills of entrepreneurship.

The issue of training is supported by McClelland's (1961) experiment which reveals that traditional beliefs do not inhibit an entrepreneur. For practical purposes, the role of training can meaningfully be studied by controlling other variables, for example, gender, finance and motivation for success. The important issue is to identify smallholder farmers who are trained in entrepreneurial skills and those who are not and look for the entrepreneurial skills that they adopt.

Skill connotes an ability and capacity obtained through deliberate, systematic and sustained effort to smoothly and adaptively carry out complex activities or job functions involving ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills) with pre-determined results often within a given amount of time, energy and other resources or expertise. Entrepreneurial skills can be learned and developed through training or experience. Smallholder farmers are expected to use the skills to perform particular tasks in their farm businesses like setting goals, risk management, value addition, marketing, book keeping and record keeping.

One of the most extensive literature reviews trainability of entrepreneur was conducted by Alborno (2008) covering the literature for the period 2000 to 2008. The study revealed that there are certain entrepreneurial knowledge and skills that have been taught and had positive results. The four key skills areas include start-up, opportunity recognition, networking and business creation. The study found out that while traits can be less learned, abilities can be learned (Kantor, 1988).

Probably Kahan (2013) summarizes well this debate well by saying that entrepreneurship can be improved through training. While the above discussions have emphasized the role of training in building entrepreneurial skills, they have not addressed the importance of needs analysis. This requires addressing the local context and environment of what is to be taught and how based on actual needs.

### **Training in Entrepreneurial Skills in Iramba and Singida District**

Entrepreneurial training in Iramba and Singida Districts were undertaken by a private company, Mount Meru Millars and an international NGO, RLDC. According to the 2011 RLDC (RLDC, 2011) during the period from the year 2008 to 2011, in Iramba districts about 93,865 smallholder farmers were trained in agronomic skills and 71,853 were trained in both agronomic and entrepreneurial skills. Likewise, a report from Singida District Council indicates that from the year 2008/2009 to 2011/ 2012 about 11,831 farmers were trained. Among these farmers, 11,563 farmers were trained in agronomic skills and 268 were trained in agronomic and entrepreneurial skills. It is not known whether training in entrepreneurial skills done to smallholder farmers had influence on sunflower productivity.

According to the trainers and the trained smallholder farmers, the skills that were taught include: goal setting, project preparation and appraisal, technical production, marketing, value addition, credit, risk-management, innovation, management of resources, book keeping, record keeping and report writing. After the training, the farmers were facilitated with agronomic practices by extension officers, access to new or improved inputs especially seed through the processors, services related to contract farming, quality and weight control services, financial services, information services through rural radio among others.

A study assessing the effect of this training on productivity involving trained and non-trained farmers was conducted in 2012.

### **Challenges to Assessing the Effect of the Training**

Effect assessment is not easy and is plagued by methodological difficulties, especially where the intervention is coupled with other complementary inputs, for example training and credit, or training and contract agreement (Kuzilwa, 2005; Adams and von Pischke, 1988). Isolating the effect of the intervention becomes a

gigantic task. Amongst the adopted approaches on effect or impact assessment are cross-section approaches comparing treatment group against a control group, to see if there are significant difference between the two groups on the identified parameters. The challenge of this approach has been biases arising from difficulties in obtaining a comparable control group. Another approach is to study participants before and after the intervention, and estimate the incremental effect of the intervention. This would require undertaking a baseline survey study to establish the before situation. Another approach has been longitudinal studies, where participants are tracked over a period of time to assess selected indicators aligned to the intervention.

Despite the methodological difficulty, this study adopted an approach of comparing participants (trained) against non-participants (not trained). In particular, and for a particular harvest season, we estimate the productivity of the two groups and also be factoring a training variable we estimate if it had a significant positive contribution or not. The justification is that the smallholder farmers are from districts with similar characteristics and all small holder farmers in the area participate in sunflower production as their “cash” crop and hence considered comparable.

## **2.0 MATERIALS AND METHODS**

### **2.1. Sampling frame and sample size**

The sampling frame of the study consisted of a list of all smallholder farmers who attended training in entrepreneurial skills and those who did not attend such training. The sampling frame was obtained from village registers and smallholder farmers’ training attendance lists provided by the leaders. One of the challenges was that village registers were incomplete and did not have the names of all the smallholder farmers. Nonetheless, majority of the smallholders were included.

Purposive sampling technique was used to select Singida region, Iramba and Singida districts that had smallholder farmers who were trained in entrepreneurial skills and those who were not trained. Also, purposive sampling technique was used to select divisions, wards, villages, hamlets and households which had these types of smallholder farmers. This was done in order to ensure accessibility and cost reduction on data collection.

The wards which were selected included: Merya, Ikhanoda, Ngamu and Ntonge in Singida district and Kiomboi, Ulemo, Ndago and Maluga in Iramba district. The samples were selected with the assistance of District Agricultural and Livestock Development Officer for Iramba and another one for Singida. The researcher chose only those elements which he believed were able to deliver the required data. The major reason for including a respondent or member in a group was possession of expertise or experience about the problem under study.

Purposive sampling enabled the researcher to select villages, hamlets and households with smallholder farmers with farm sizes from 0.9 up to 3.0 hectares. In this respect, about 9 villages, namely Merya, Ghata, Ikhanoda, Mjughuda, Ngamu, Ntonge and Igauri were obtained from Singida district and 7, namely Mampanta, Ulemo, Kitukutu, Simbalungwala, Mkulu, Zinziligi and Maluga were obtained from Iramba district. The choice of 16 villages (Table 3.2) was based on the presence of programmes that trained sunflower smallholder farmers in entrepreneurial skills.

In order to take care of gender parity judgement sampling where by particular units of the universe for constituting a sample was deliberately chosen (Kothari, 2004; Ndunguru, 2007). A stratified sample of 96 smallholder farmers trained in entrepreneurial skills and 96 not trained from the villages in each district were randomly selected. The stratified sample comprised of 192 farmer respondents who were trained (125 males and 67 females) and 192 who were not trained (137 males and 55 females) in entrepreneurial skills was obtained. The main unit of analysis was the household Table 1 shows the breakdown of the sample by ward and village in each of the two districts, Singida Rural and Iramba.

The selected stratified sample was adequate for the purpose to minimise sampling errors. According to literature, regardless of the population size; a sample or sub-sample of 30 to 2000 cases is a bare minimum for studies in which statistical data is to be done (Bailey, 1994). Data was collected through structured questionnaire administered to the sampled farmers.



**Table 1: Distribution of respondents by their training status and residence**

District	Ward	Village	Training status				No. of respondents (N=384)
			Trained		Non trained		
			Male	Female	Male	Female	
Singida	Merya	Merya	8	2	13	7	30
		Mvae	5	-	2	-	7
		Ghata	-	2	-	-	2
		Kinyamwambo	4	3	1	1	9
	Ikhanoda	Ikhanoda	13	2	2	1	18
		Mjughuda	6	3	17	4	30
	Mwasauya	Ngamu	12	12	14	10	48
	Ntonge	Ntonge	8	3	9	9	29
		Igauri	4	9	3	3	19
Total	4	9	60	36	61	35	192
Iramba	Kiomboi	Mampanta	18	6	19	5	48
		Ulemo	7	2	7	1	17
		Kitukutu	5	1	1	5	12
		Simbalungwala	3	2	4	1	10
		Mkulu	3	1	4	1	9
	Ndago	Zinziligi	21	3	14	10	48
	Maluga	Maluga	13	11	18	6	48
Total	4	7	70	26	67	29	192

## 2.2 Data Analysis

Data were analyzed for descriptive statistics such as frequencies and percentages. Furthermore, the effect of adoption of entrepreneurial skills on sunflower productivity was estimated for the harvest season 2011/12 by the use of Cobb Douglas production function. Control was made for other factors which are thought to affect production of sunflower. The Cobb-Douglas production function can be presented as follows:-

$$Q = AX^bX^{(1-b)} \dots\dots\dots(1)$$

Where:

A = Positive constant term and b a positive fraction.

Q and X are the dependent variable (Output) and X is the independent variables representing the factors influencing output.

The equation can be conveniently transformed into log form to translate the coefficients into supply or output elasticities.

$$\ln Q = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \dots + \beta_n \ln X_n + \mu \dots \dots \dots (2)$$

Where:

$\beta_0, \beta_1, \beta_2 \dots \beta_n$  and  $\mu$  are parameters to be determined by the equation,

The dependent variables were:

- Size of farm under sunflower cultivation in hectares;
- Family labour inputs under labour in number of persons;
- Farming experience measured in years;
- Distance to farming location in kilometres;
- Level of education;
- Entrepreneurial skills training: Binary “1” if attended and “0” if not attended;
- Quantity of Sunflower seeds used in kilogrammes.

### **3.0 RESULTS AND DISCUSSION**

#### **3.1 Characteristic of respondents**

Table 2 provides a summary of the profile of the respondents, both those who received the training and those who did not. Overall, most of the farmers in the sample (about 88%) had at least primary level education and therefore could read and write. The average age of the sample was 39.3 years for those trained and 42.3 years for those not trained, reflecting a relatively young population. The average farm size is around one hectare for farmers who received the training and those who did not. The average number of people in the farming activities was also similar between those trained and those not trained.

**Table 2: Summary Profile of the Respondents**

Characteristics	Smallholder Farmers' Responses	
	Trained	Not Trained
Sample Size (n)	192	192
<b>Sex:</b> Male %	65.1	71.4
Female %	34.9	28.6
<b>Marital Status:</b> Married %	89.6	89.6
Otherwise%	19.4	19.4
<b>Level of Education</b>		
Never Attended School	1.8	3.1
Primary School Education	88.8	87.5
Secondary School Education	8.1	9.0
Tertiary Education	1.3	0.4
<b>Average Age of Respondent</b>	39.3	42.3
<b>Number of people in the household</b>		
(1-3 people %)	12	17.7
(4-6 people %)	32.8	39.1
(7 and above %)	55.2	42.2
<b>Average no of people in the household</b>	5.4	5.4
<b>No of people in farming activities</b>		
(1-3 people %)	64.6	72.9
(4-6 people %)	31.8	23.9
(7 and above %)	3.6	3.1
<b>Average Dependency Ratio</b>	1:5	1:7
<b>Average farm size – sunflower 2011/12</b>	1.2	0.8
<b>Average sunflower productivity</b>	763	589

### 3.2 Training provided

Table 3 indicates the types of entrepreneurial skills taught to sunflower smallholder farmers, which included risk management, marketing, value addition, book keeping, goal setting and record keeping. As shown in Table 3, some few farmers in the sample and especially in Singida district, missed some of the training.

**Table 3: Types of entrepreneurial skills taught**

Skills	Name of District			
	Singida (N=96)		Iramba (N=96)	
	Responses			
	Yes	No	Yes	No
Risk management	93	3	96	0
Marketing	95	1	96	0
Value addition	91	5	96	0
Book keeping	94	2	95	1
Goal setting	94	2	95	1
Record keeping	95	1	94	2

### 3.3 Effects of Adoption of Entrepreneurial Skills on Productivity of Sunflower

Table 4 presents the results from the regression analysis from the Cobb Douglas production LNSEEDS function of sunflower production of the 382 smallholder farmers. The results show that the targeted variable, which was a dummy variable for adoption of entrepreneurial training had a positive effect on sunflower output. The coefficient for this variable is 0.127 and significant at 10%. The interpretation is that adoption of entrepreneurial training contributed 0.127 percent of output attained. The control variables were typical production inputs, including land cultivated, labour and quantity of seeds used. The coefficient for size of farm cultivated (LNFARMCULT), which is land output elasticity, is 0.647. It is significant at 1%. Seed also had a positive effect on output, with an output elasticity of 0.428, which is significant at 5%. These two inputs had expected signs.

**Table 4: Effects of adoption of entrepreneurial skills among smallholder farmers on sunflower productivity**

Independent variables	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	-1.083	.532		-2.034	.043**
LNSEEDS	.428	.203	.135	2.104	.037**
LNFARMCULT	.647	.095	.481	6.808	.000***
LNFAMILYLA	-.217	.127	-.117	-1.711	.089*
B					
LNEXPER	.092	.090	.073	1.018	.310
Adopt	.067	.036	.127	1.896	.060*

Dependent variable kilogrammes of sunflower produced per hectare

R                      R Square      Adjusted R Square  
.546                      .299                      .274

Key \*\*\* Significant at 1%, \*\* Significant at 5% and \* Significant at 10%

Family labour (LNFAMILYLAB) is found to have a negative influence on productivity, with a supply elasticity of -0.217, significant at 10%. This is not according to the expected positive contribution of labour. This result may depict diminishing marginal productivity of labour, may be resulting from limited and fixed farm size.

The constant variable is negative -1.083, and significant at 5%. This depicts that there are unobserved factors that negatively affect production of sunflower. This constant is also supposed to capture the effect of existing technology used by smallholder farmers, depicting that it has a negative effect on production. Experience (LNEXPER) does seem to have a significance effect on productivity.

#### 4.0 CONCLUSION AND POLICY IMPLICATION

This study sought to assess the effect of smallholder sunflower farmers entrepreneurial training on productivity. The approach used was to compare farmers that have received training and those that have not. To estimate this effect, Cobb-Douglas production function was used, with a dummy variable to capture entrepreneurial training. The positive supply and statistically significant elasticity of adoption of entrepreneurial skills support the current literature about the importance of such skills for farmers.

The main implication of these results is that in addition to providing technical agronomic skills, small holder farmers should be provided with entrepreneurial training. To make this sustainable it could be incorporated in the extension services provided by the extension staff.

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