

Full Length Research Paper

Factors contributing to continued dependence on family food and income among graduate farmers of School of Agriculture for Family Independence (SAFI)

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The main focus of this study was to investigate factors that contribute to continued dependence on family food and income among graduate farmers of School of Agriculture for Family Independence (SAFI) in Malawi. The study used two step sampling approach where purposive sampling was used in the first place to select SAFI graduates and secondly, systematic sampling was used to select 35 SAFI graduate farmer families for direct interviews using a semi structured questionnaire. Results of the study showed that factors responsible for reduced crop production were directly correlated to increased dependence of the graduate farmers on the institution. The findings highlighted that inputs from SAFI, primary education, increase in years after graduating from SAFI, and extension services from SAFI were the main factors responsible for increased dependence on family food and income among SAFI graduates. The study recommended that SAFI graduates be affiliated with government agriculture extension workers, and field workers of other available service providers (partners) in their communities to keep the farmers refreshed on modern methods of farming and monitor implementation of modern technologies. In addition, SAFI should introduce age limit and minimum entrance academic qualifications in order to train the right caliber of farmers who are likely to increase agricultural productivity and eliminate dependence on food and family income.

Key words: School of Agriculture for Family Independence (SAFI) graduates, dependence, crop production, primary education.

INTRODUCTION

In 2002, there was famine that hit different parts of Malawi and Traditional Authority, Chakhaza in Dowa district was not spared. Napoleon Dzombe and other partners such as Nu Skin Enterprises and Force for Good, an America corporation and charity responded with relief food to avert the situation. However, it was

observed that handouts would not be sustainable and soon they decided to establish Mtalimanja Community Based Organization (CBO). The organization was mostly teaching basic methods of farming as one way to help farmers produce their own food in sufficient quantities from their land. The initiative grew bigger such that in

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2007, School of Agriculture for Family Independence (SAFI) was born out of Mtalimanja Community Based Organization, this time with a mandate to provide formal and more thorough training to farmers not only from Dowa district but also other districts such as Lilongwe, Ntchisi, Kasungu, Mchinji and Mzimba. The SAFI and is focused on helping the people of Malawi learn better agricultural techniques to provide for themselves and their families. Malawi is one of the poorest countries in the world and one in three people in Malawi is threatened by hunger every day. During 2009, it was the first graduation ceremony, since then, SAFI has been training farmers in different innovative agricultural practices that help to attain livelihood security.

The subjects taught under this program include: nutrition, crop production, livestock production, irrigation, fisheries and horticulture and agri-business. In addition to making the farmers independent, the student farmers are trained as trainers of other farmers (lead farmers) when they return to their villages.

SAFI trains farmers for two years. Farmer families spend one year at SAFI, where both wife and husband attend classes and practice. Each family is allocated two acres of land, farm inputs such as fertilizers, seeds and basic farm tools to allow them practice what they learn in class. SAFI has employed well experienced graduates from Lilongwe University of Agriculture and Natural Resources (LUANAR) and Natural Resources College (NRC) who work as training officers for the farmers. In the second year, farmers go back to their homes where they replicate what they learnt and practiced at SAFI. Same amount of inputs are provided on loan and this time training officers visit them regularly throughout the second year to make sure they are following the recommended practices. At the end of second year and upon meeting graduation requirements, farmers graduate and at the beginning of third year, they are given the same inputs in a form of a grant. From this point on, farmers are weaned from the programme.

The School of Agriculture for Family Independence is the only school of its kind in the country. The selection criteria for farmers to come to SAFI stipulates that they should possess reasonable literacy and numeracy skills, they have to be currently active as smallholder farmers, energetic but hardly producing enough to feed their families from one harvest to another. From the baseline data that is collected at the beginning of each year by SAFI management, it has been observed that SAFI recruits farmers who produce an average of 5 bags (50 kg each) of maize, one 50 kg bag of soybean and 25 kg bag of groundnuts. What is surprising though is that when same farmers spend one year at SAFI, their productivity in all the crops increases tremendously (SAFI, 2012). When they go back to their villages, productivity tends to reduce in some cases (SAFI, 2014). It is against this background that this study was proposed.

The aim of the study was to investigate the factors that

contribute to continued dependence on family food and income among SAFI graduate.

METHODOLOGY

Purposive sampling was used to select 45 respondents among the 75 SAFI graduates. The study used primary data collected using a semi-structured questionnaire. Data was analyzed using Statistical Package for Social Science (SPSS) version 20 & Excel to generate percentages, frequencies, graphs and linear regression model outputs.

The approach used the crop production trends before and after graduation from the School of Agriculture and Family Independence to identify the influencing factors. The factors responsible for the trends in crop production were used to assess the continued dependence of the farmers on SAFI graduates. Drawing on the productivity of main crops planted by farmers, detailed analysis of the factors affecting production was done to depict associating factors towards the continued dependence by the SAFI graduates as crop production determines farmer's dependence. Specifically, linear regression model was used to identify factors that contribute to continued dependence on family food and income among SAFI graduates. The model was constructed as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \mu$$

Where Y_i is the independent variable expressing total crop production that determines farmer's dependence; X_i are the factors determining dependence (crop production); $\beta_0 \dots \beta_7$ = production function parameters to be estimated; μ is the random error term.

Review of literature

Agriculture in Malawi

Malawi has a population of almost 17 million. The Human Development Index report, ranked Malawi on position 153 out of 169 countries surveyed (UNDP, 2010). Land-locked with no significant mineral resources, Malawi's principal asset has been the hard-working people, the relatively fertile land, extensive indigenous forests and the abundant of fisheries (Bunderson et al., 2002). Reflecting these endowments, agriculture has dominated the economy, contributing 40% of the GDP, 85% of the foreign exchange earnings and 85% of the labor force. Forests supply, 90% of the domestic and industrial energy requirements, while fisheries provide not less than 75% of the total animal protein (FAO, 2016).

Agriculture accounts for about 93% of the total export earnings, 80% of the total employment and 27% of the country's GDP (GoM/GAPNRM, 2006). Saka et al. (2006) added that the sector contributes 63.7% of total income for the rural poor, occupies about 56% of the land area (5.3 million out of 9.4 million hectares) and supplies at least 65% of the manufacturing sector's raw material requirements. It implies then that poverty reduction in Malawi can be achieved if more emphasis is put on improving agricultural productivity.

Phiri et al. (2012), Gossage (1997) and Orr et al. (1998) described agriculture as strongly dualistic in structure, consisting of smallholder farmers and the estate sub-sectors. These sectors are basically farm types in Malawi. Legally and constitutionally, the sectors have rules that regulate land tenure, type of crops grown and marketing arrangement. The estates are on private land under freehold or leasehold status, while smallholder farms are under customary land tenure rules and rights. Smallholder farmers contribute 80% of total agriculture production, while the estate

sector controls 90% of the agriculture export trade. Major food crops are maize, groundnuts, soybean, cassava, pulses, sorghum and rice. Principal exports include tobacco, tea sugar, coffee, groundnuts, cotton and macadamia nuts (Bunderson et al., 2002). Therefore, agriculture appears to be the most important sector of the economy if statistics above is anything to go by.

Small-scale farm families in agricultural productivity

Smallholder farming is claimed to contribute 80% of total agriculture production in Malawi (Masina, 2009). However, regardless of its contribution, their farming practices and productivity leaves a lot to be desired. According to Kaperemera (2001) as well as Chirwa et al. (2008), the smallholder sector is continually faced with declining farm productivity. Most households lack the resources and the support to integrate sound conservation and agronomic practices into their farming systems. The situation is compounded by increasing land shortages and farm fragmentation which forces many farmers to undertake continuous cropping in monocultures, often on marginal land FAO (2012). This has led to serious problems of water runoff and soil degradation. According to FAO (2012), the problems have resulted in loss of structure, moisture holding capacity, nutrients and organic matter in soils hence reduced productivity.

Due to the low productivity of the majority of small-scale farmers, they find themselves unable to provide enough food for their families. With average household size on 5.7 in Malawi, it is expected that each household has not less than 500 kg of food. However, this is not the case and most of the farming households run out of food before the next growing season and end up depending on government, well-wishers and piecework for food. Bunderson et al. (2002) reported that despite huge efforts to increase agricultural productivity, nearly 60% of smallholder households in Malawi still live below poverty line due to chronic farm input shortages. Poor land husbandry practices, poor access to financial resources and inputs, climate change and over reliance on rain fed agriculture are some of the prominent issues that have been identified as key contributors to the perpetual food shortages facing the majority of Malawi's households (GoM, 2006).

RESULTS

The study revealed that the average age of the husbands was 37 with the 25 and 71 years as minimum and maximum, respectively. On the other hand, the mean age for the wife was 32 with 23 and 68 as minimum and maximum ages, respectively. Household size among the sampled respondents had an average of 6 and 11 individuals as maximum per household and 3 individuals as minimum. The study also showed that the mean education levels for husbands and wives were junior secondary education (form 1-2) and primary education, respectively. With regards to landholding size and use, the study showed that the respondents had an average of 4.5 and 3.09 acres in relation to their land holding size and land in use respectively.

Results from the linear regression analysis showed that secondary education, year after graduation from SAFI, household size, total size of land in use, inputs from SAFI, and peer pressure had significant and positive effect on maize production (Table 2). Age of the household head, household size and extension services

from SAFI had positive significant effect on soya production among the participating farmers (Table 2).

DISCUSSION

The trend of maize yield increased significantly up to 60 (50 kg bags) during SAFI but increased at a decreasing rate thereafter as compared to the year before SAFI. This is because farmers tend to use inputs meant for an acre on a bigger piece of land, among other factors. However, production of all legumes such as ground nuts, soya bean and kidney beans is low at SAFI due to small land size allocated to legumes. The trend portrays decrease in maize production after leaving the school of agriculture thereby making farmers to remain food insecure which influences them to remain dependent on SAFI and other organization's initiatives.

Regarding specific factors responsible for continued dependence among the farmers, it was learnt that factors which gave farmers a disadvantage in production positively correlates with dependence of the farmers. The study indicates that factors negatively affecting production were reported to be the main drivers contributing to the continued dependence on family food and income among graduate farmers of School of Agriculture for Family Independence. The results in Table 1 indicates that age, primary education, secondary education, household size, inputs from SAFI, peer pressure, extension services and age had a significant effect. This contradicts what Bimpeh (2012) informed that farmer trainings have a positive effect on the production of many rural smallholders farmers. However, inputs from SAFI, primary education, increase in years after graduating from SAFI, and extension services from SAFI were the main factors responsible for increased dependence of SAFI graduates.

Dependence in relation to maize production

Regarding education, it was shown that attaining primary education by the household head reduces maize production by 201 kgs. This means that a farmer is less likely to adopt new and improved methods of farming that are essential for production to be increased. Baylin and Pahuang (2001) also reported that education level has a significant effect on adoption of agriculture technologies. This conforms to the findings of Abas (2016) who reported that, "Education levels have influence in managing farming activities; farmer with higher educational level can be able to make decisions at once if faced by several problems related to farming activities, thus making a farmer to increase self-reliance". In so doing, farmers with low education levels were reported to depend much on SAFI even after graduation hence primary education being a factor for continued dependence on SAFI. This is the case as the farmers

Table 1. Key descriptive statistics.

Variable	Mean	Minimum	Maximum
Husband's age	37	25	71
Wife's age	32	23	68
Husband's education	Form 1-2	Primary	Form 3-4
Wife's education	Primary	Primary	Form 3-4
Household size	6	3	11
Land holding size	4.5	1	20
Land in use	3.09	1	6

Source: This study.

Table 2. Factors affecting crop production that determines farmer dependence.

Factor	Maize production				Soya production			
	Coefficient	Std. Error	T	p-value	Coefficient	Std. Error	t	p-value
(Constant)	2200.382	4147.109	0.531	0.600	294.374	465.648	0.632	0.534
Age	-88.928	66.668	-1.334	0.194	-5.511	7.705	-0.715	0.048***
Primary education	-201.150	106.965	-1.105	0.279	-219.419	79.231	-2.009	0.058
Secondary education	914.150	326.965	2.705	0.028***	327.928	86.965	1.830	0.279
Years after graduating	424.099	91.941	-4.613	0.005***	14.405	80.304	-0.179	0.0859
Household size	259.598	102.670	2.805	0.043***	24.539	46.436	0.528	0.03***
Number of dependents	467.986	843.150	.555	0.584	6.786	101.064	0.067	0.947
Size of land	133.848	83.339	-1.249	0.805	-19.958	34.634	0.576	0.571
Total size of land in use	941.842	389.185	2.420	0.023***	81.564	53.569	1.523	0.144
Inputs from SAFI	1027.657	400.941	2.218	0.042***	116.178	95.216	1.22	0.949
Extension services from SAFI	442.971	319.877	1.540	0.593	277.155	95.216	2.910	0.004***
Peer pressure	850.757	400.242	2.07	0.031***	119.899	96.544	1.242	.226

***Significant at 5%. Source: This study.

with low education experienced decrease in maize production after leaving the school of agriculture, thereby remaining food insecure which makes them to remain dependent on SAFI and other organization's initiatives.

Household size had a positive and significant effect ($p < 0.05$), indicating that productivity increased with each addition to members of the household by 259 kg. This too is in agreement with the findings of Abas (2016) who affirmed that "the size of the farmer's own family might become more important in determining the availability of family labor for farm work". Total land in use had also a positive and significant effect on maize production of the farmer. This entails that increase in total land in use by an acre increases maize production by 915 kg. Unlike size of land since having more land does not imply more production, it is the land being used and how it is being used that will increase production. The study noted that farmer graduates with small land size for cultivation were not able to produce enough for food and income security hence increased dependence on SAFI even after graduation.

Another positive and significant factor was inputs from

SAFI where it was indicated that a percentage increase in inputs might result into increase in total maize production of the farmers by 1027 kg. This therefore relays a great role inputs from SAFI play in increasing maize production of the farmer. However, the inputs received from SAFI gave the farmers a dependence syndrome and suffers after SAFI withdraws the inputs thereby reduction in production.

Peer pressure had a positive and significant effect on maize production for the SAFI graduates. Farmers learn from fellows on different agricultural practices that proved having significant effect on total production. In so doing, increase in peer pressure among the farmers, increases maize production by 850 kg. This reflects the importance of on campus training that SAFI provides to the farmers in improving self-reliant agriculture for small holder farmers. This entails that withdraw of inputs by SAFI 2 years after graduation places the farmers on disadvantages as overall production drops. The drop in crop production exposes the farmers to hunger problems, which forces them to depend on SAFI even after graduating.

Dependence in relation to soy bean production

Age is negative and significantly related to soya bean production such that an increase in age of the farmers leads to decline in production by 6 kg. Primary education also had a negative and significant effect on soya bean production. Holding other factors constant, attaining primary education by the farmer reduces soya production by 219 kg. Decrease in production increases farmers' vulnerability to hunger, thereby allocating the income from legumes into staple food than inputs for next growing season. The study has proved that such state forces farmers to continue depending on SAFI for inputs and extension services.

Household size had a positive and significant effect ($p < 0.05$) on soya bean production of the farmers. It was shown that soya bean production increased with each additional member of the household by 25 kg. This may be the case as the household member provides labour for production hence contributing to increase in soya bean production, as it is labour demanding.

Extension services from SAFI had also a positive and significant effect on soya bean production of the farmer. This means that a percentage increase in agricultural extension services from SAFI increases soya production by 277 kg. The results show that training on agricultural practices by the SAFI extension workers positively affected agricultural productivity of the farmers. This correlate with what Wei (1999) and Fane (1975) published that farmer training positively affects productivity by the farmer graduates. So, as SAFI reduces the extension contact with the graduates, productivity gets reduced which affect overall crop production, thereby remaining dependent on SAFI even after graduation.

CONCLUSION AND SUGGESTIONS

Production of food by farming families adequate for their year round consumption is the sure way of safeguarding food security and indecency from support structures. There is however a need to consider the other factors that indirectly contributes to the current productivity of graduate farmers from SAFI. The study reveals that the SAFI program needs to review its recruitment criteria to screen factors of individual's age, education level and size of family. A well selected group of student farmers can increase the adoption levels of production technologies leading to higher yields.

It is also recommended that the training program needs to include some courses that encourage behavioral change, as the study has shown that even with adequate inputs, farming families still are dependent on the school, suggesting a need for change in farmer's perspective.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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