

# Agricultural Productivity, Climate Change and the Entrepreneurship of Smallholder Farmers: Case of the Central and Western Regions of Liberia

By

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## EXECUTIVE SUMMARY

Liberia was making frantic efforts towards achieving food security through improvements in smallholder farmers' productivity. However, the 1989-2003 civil conflict destroyed the economic life of the country, and reversed the positive trend towards food security. This situation undermined the growth of smallholder farmers' entrepreneurship. Hence, this research assesses the extent to which agricultural productivity and climate change influence the entrepreneurship of smallholder farmers. The research was mainly based on primary data, using Statistical Package for Social Sciences (SPSS) to analyze structured questionnaires for 864 smallholder farmers.

The production techniques and tools used by smallholder farmers were traditional and this had implications for value-added productivity. The entrepreneurship of smallholder farmers was also limited to a few months during and after harvest. The level of entrepreneurship was 47 percent for

rice farmers, 67 percent for cassava farmers, and 93 percent for vegetable farmers. The traditional nature of pre-and-post-harvest technologies and facilities affected the productivity and entrepreneurship of smallholder farmers.

In addition, 97 percent and 77 percent of farmers carried their crops to town and to the market on their heads, respectively, due to the non-motorized modes transport. 24 percent of smallholder farmers used fertilizers. Seventy-eight percent never received a loan. 38 percent of smallholder farmers' yields were affected by sunshine, 85 percent by rodents, and 71 percent by birds.

There is a need to ensure capacity building support to increase productivity, reduce climate change impact and ensure sustained entrepreneurship of smallholder farmers.

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## INTRODUCTION

Liberia gained independence in 1847, thereby making it Africa's first internationally recognized, independent country. The country later suffered many years of poor governance, political and economic exclusion, and grew without development (Clower et al, 1966). As a result of these conditions, political militancy increased to a peak that influenced the 1980 military coup, and a 14-year conflict (1989-2003). Prior to the war, average per capita income was USD 750 and the annual GDP growth rate was 5.7 percent (GOL, 1975-1986). But the impact of the war made the socio-economic situation of Liberians deplorable, destroying all development sectors of the country. One of the principal focal points of the reconstruction processes is the agriculture sector, which is also the third pillar of the country's development paradigm known as the Poverty Reduction Strategy (GOL / UNDP, 2008).

In the late 1980s, Liberia was making frantic efforts towards achieving food security. But the civil conflict destroyed the economic life of the country and reversed all gains towards food security. It has undermined the growth and entrepreneurship of smallholder farmers in Liberia. Hence, government and its partners have been making efforts to rehabilitate the agriculture sector. Consequently, this research attempts to assess the impact of agricultural productivity and climate change on the entrepreneurship of smallholder farmers, using the Western and Central Regions of Liberia as a case study.

The study is relevant because it provides policy recommendations for governments' vast agriculture sector reform programmes, such as the West Africa Agriculture Productivity Programme (MOA, 2006), the Liberia Agriculture Investment Programme, and the Comprehensive African Agriculture Development Program (MOA, 2009).

## METHODOLOGY

The research is mainly based on primary data. Although a total of 800 farming heads of households were planned for interview, 864 were chosen. The increment in the sample size was based on the fact that more enumeration area was accessible than previously envisaged in the planning stage of the survey. The 864 households were distributed among the four counties of the Central and Western regions of Liberia, using probability proportional to size of the 2008 census households for the regions. Four Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) comprising of 48 persons were applied to augment the structured questionnaire interview process. Hence, the overall sample size was 912.

The data from structured questionnaires was programmed and processed using version 16 of the Statistical Package for Social Sciences (SPSS), while the data gathered from FGDs and KIIs were processed manually. Other statistical methods used include frequency tables, measure of central tendency, percentages and graphical presentations. These methods were used to determine the impact of climate change and productivity on the entrepreneurship of smallholder farmers.

**If the country is to promote high productivity and entrepreneurship among smallholder farmers, it is important for government to improve the development of farm-to-market roads and provide food crops processing equipment in rural parts.**

## RESULTS AND CONCLUSIONS

The average smallholder farmer is a middle-age adult. Males dominated as the head of households, comprising 72 percent of the 864 farmers interviewed. Marriages are high among smallholder farmers, with 88 percent currently married. The overall economic dependency ratio is 1.97:1, or nearly two dependents per smallholder farmer. The study shows that 37 percent of smallholder farmers are illiterate, with 56 percent at both primary and secondary levels of education.

The research shows that women are allowed to own land for agricultural purposes, while 98 percent are fully participating in household level decision-making. The tools and methods of farming were traditional. Hence, all of the 864 smallholder farmers never used machines for land cultivating and planting of food crops. In essence, only five percent and eight percent of farmers used improved methods of rice and cassava planting, respectively. The tools and methods of harvesting crops are also predominantly traditional and seem not to add value. Ninety-five percent of smallholder farmers believe that new farming techniques will increase productivity and address the problem of pre-and-post harvest losses.

In 2011, the average smallholder farmer produced 276 kg bags of rice, 535 kg bags of cassava, and 344 kg bags of vegetables per farm. Eighty-nine percent of smallholder farmers believe that the use of traditional techniques and the lack of tools and access to credit are some of the major factors responsible for the low level of production. It was found that 67 percent of 698 smallholder farmers dried rice using traditional methods and materials. Similarly, none of 698 smallholder rice farmers had access to machines for the de-husking of rice. Hence, they use the traditional method of de-husking rice. It was revealed that 98 percent of smallholder farmers store rice in bush-tents, which is not protected from birds, rodents and other animals. Further studies in the Western and Southeastern part of Liberia confirmed that farmers store rice in bush-tents (MoA, 2010 and 2011).

The method of rice threshing among smallholder farmers was found to be predominantly traditional and increases post-harvest losses (27 percent of rice; 26 percent of cassava and 28 percent of vegetable). It also infects the rice with sand and rocks, which does not promote food security or encourage entrepreneurship of smallholder farmers. Further studies suggest that the traditional post-harvest techniques led to losses of 36.1 percent and 28 percent tons of rice in 2007 and 2008, respectively (MoA, 2009).

This study revealed that 92 percent and 76 percent of farmers transported produce on their heads from the farm to town and from home to the

market, respectively, which does not add value to productivity and entrepreneurship. Ninety-five percent of the 864 smallholder farmers show that lack of motorized transportation affect the level of entrepreneurship in the Central and Western regions of Liberia. The study shows that 78 percent of the 864 smallholder farmers never received agricultural loans in 2011. Of the 864 smallholder farmers in the Central and Western regions of Liberia in 2012, only 24 percent used fertilizers on their farms in 2011. It was also found that 38 percent of smallholder farmers' yields were affected by sunshine, 21.6 percent by flooding, 66 percent by insects, 85 percent by rodents, 71 percent by birds, and 31 percent by armyworms.

**There is a need for the Ministry of Agriculture to provide tools and improve on farm technology through extension services.**

The level of entrepreneurship varies by the type of crops and was limited to only a few months during and after harvest. Of the 609 upland rice farmers, 45 percent sold rice, while 50 percent of the 333 undeveloped lowland farmers sold rice. Moreover, 67 percent of the 747 cassava farmers sold the product, while 93 percent of the 547 vegetable farmers engaged in entrepreneur activities. The low level of entrepreneurship has implications for the welfare of smallholder farmers.

## IMPLICATIONS AND RECOMMENDATIONS

Factors influencing agricultural technology, climate change, productivity and entrepreneurship of smallholder farmers are directly associated with human capacity development. This is because smallholder farmers in Liberia use traditional tools. They lack adequate extension services, and agricultural loan management skills. Smallholder farmers also lack inputs such as fertilizers to improve yields. This situation shows that there are huge human and material capacity problems among smallholder farmers. Other studies conducted in the Western (IFAD-MOA, 2011) and Southeastern (AfDB-MOA, 2011) parts of Liberia identified traditional tools as the only means of clearing land for planting of food crops, which has implications for the productivity and entrepreneurship of smallholder farmers.

The research in the Central and Western regions of Liberia identified similar capacity issues of smallholder farmers. Interviews of 48 key informants revealed that traditional methods of planting and harvesting negatively affects the productivity of smallholder farmers. Therefore, increased capacity development has implications for enhancing productivity and entrepreneurship of smallholder farmers. As a consequence, the Government of Liberia should focus on and invest in capacity building of smallholder farmers in order to ensure high productivity and entrepreneurship in the two regions.

Further, 95 percent of the 864 smallholder farmers interviewed saw the introduction of new techniques through extension officers, using farmers' field school (FFS) or other procedures as a way of addressing the problems of low productivity and pre- and post-harvest losses. Expanding and strengthening extension services is relevant to enhancing productivity and entrepreneurship of smallholder farmers. This includes training, life skills and education, and

start-up and sustainability loans for smallholder farmers. The capacity building of smallholder farmers will create an enabling environment for a viable food security system and subsequent sustainable entrepreneurship. Therefore, there is a need for the Ministry of Agriculture to provide tools and improve on farm technology through extension services.

The capacity development of smallholder farmers will improve the output of smallholder farmers above the 2011 level of 276 kg, 535 kg and 344 kg bag for rice, cassava and vegetables, respectively. In addition, it will ensure high productivity and ensure the sustainability of farmers' productivity in the regions of study. This study indicated that the entrepreneurship was limited to a few months during and after the harvest seasons. But improving tools and technology for farmers will sustain entrepreneurship and commerce beyond the seasonal trade in the regions.

Evidence from the study shows that seed rice was more expensive than clean rice in all of the four counties. Hence, government should strengthen supply of inputs, including seed rice. The average price of upland seed rice is USD 77.09, and USD 89.53 per kg bags of lowland seed rice, which is high and could influence the low productivity of farmers. Moreover, 76 percent of the 864 smallholder farmers did not use fertilizers in the 2011 farming year. Also, 78 percent of the 864 farmers never received loans for agricultural purposes, while 44 percent of farmers reported the non-participation of youth in agricultural activities. Hence, there is a need to encourage the involvement of youth in agriculture activities.

The study also shows that post-harvest technology in the Central and Western regions of Liberia was weak and purely traditional, as 53 percent of 102 smallholder farmers dried rice on the ground, while all rice farmers de-husk rice using traditional methods and tools. It was discovered that post-harvest storage

facilities were also traditional, as 98 percent of rice farmers used bush-tank and attics as principal storage facilities. As a consequence, the lack of improved post-harvest facilities, such as rice threshers, farmers used traditional methods and materials for threshing of rice. All of the above traditional post-harvest technologies have implications for the high level of post-harvest losses. Hence, there is a need for government to help in improving harvest and post-harvest management of crops in order to enhance productivity and entrepreneurship.

This research shows that the lack of motor roads and transport facilities affect access to value chain processes. It was further shown that the lack of an adequate enabling environment to promote value chain processes affect the amount of agricultural produce sold in the local markets. For example, 97.9 percent of the 864 farming households carried rice to town physically on their heads or in wheelbarrows, while 77 percent carried produce to the market on their heads. The research revealed that the absence of modern equipment to process rice and cassava further affected access to post-harvest facilities and value chain processes in the C&WRL. This is so because 85 percent of farmers processed

cassava into farina and fufu using traditional methods. Therefore, if the country is to promote high productivity and entrepreneurship among smallholder farmers, it is important for the government to improve the development of farm-to-market roads and provide food crops processing equipment in rural parts.

This research indicated that climate change impact affects the productivity of farmers; hence, it hinders their entrepreneurship as well. As a consequence, 98 percent of farmers had no drought-resistant varieties of crops. Also, 30 percent of farmers reported crop destruction by undue rainfall; 45 percent by sunshine; 66 percent by insects; 85 percent by rodents; 71 percent by birds and 69 percent by armyworms. This means that climate change interventions have implications for enhanced productivity and entrepreneurship of smallholder farmers. Hence, in order to limit the impact of climate change activities on the productivity of smallholder farmers, integrated pest and plant management technology should be provided in the region. In addition, weather monitoring information should be made available in the regions in order to reduce the effect of excess sunshine and rainfall on the productivity of smallholder farmers.

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