



IMPROVED COOPERATIVE PARTICIPATION IN OGUN STATE: THE PANACEA FOR TECHNICAL EFFICIENCY OF CASSAVA FARMERS IN POST-COVID NIGERIA

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Introduction

Agriculture is a major source of livelihood and contributes tremendously to the development of many economies. It continues to be a strategic developmental sector in the sub-Sahara Africa (SSA), and employs about 40% of active global labor force (World Bank, 2021). Agriculture generates employment for about 70% of Nigerians and accounts for more than 40% of Nigeria's Gross Domestic Product (GDP), with crops accounting for 80%, livestock 13%, forestry 3% and fishery 4% (Federal Government of Nigeria - FGN, 2016). The crop sub-sector is dominated by food crops such as root and tuber production.

Cassava is one of the major root crops cultivated in Nigeria and it is a major source of food and income for most urban and rural communities (Abang, Ekpe & Usani, 2001; Itam, Ajah, Ofem & Abam, 2015). Cassava is a crop for international trade which can boost foreign earnings and also create jobs for many (Ayoola, 2013). In spite of upward production from 9.3 million tonnes in 1970 to 59.5 million tonnes in 2018, Nigeria's cassava export value is still significantly low (CBN, 2019; FAO, 2018).

Over 90% cassava production in Nigeria was processed into food for human consumption, thereby, leaving significant industrial demand for the output as raw materials. This has made the country a major importer of cassava derivatives valued at about \$600 million annually in spite of her leading position in cassava production (CBN, 2019; Channels, 2019; Olukunle, 2016). This

area of agriculture in Nigeria is dominated by small-skill farmers with significant level of inefficiency in resource use.

In Ogun State, cassava occupies a prominent position in economic enhancement and is being cultivated in virtually all local government areas. However, the production levels are not meeting with high demand for the product at local markets and the requirements of a variety of processing industries. According to Makinde, Balogun, Bello and Afodu (2015), there is rising demand for cassava products which local production is yet to meet. The inability to meet existing demand may not be unconnected with farmers' resource use inefficiency and non-involvement in agricultural cooperatives. The farmers depend mainly on traditional technologies which are characterised with inefficiency and poor yield. This is in spite of growing emphasis on the potency of agricultural cooperatives in enhancing technical efficiency of farmers. Thus, they lack the needed platform for learning and adopting modern agricultural technologies.

It has been established that members of cooperative societies stand a better chance to get useful information and empowerment than non-members. Yet, many farmers still prefer to operate in isolation of cooperative societies (Olagunju, Ogunniyi, Oyetunde-Usman, Omotayo and Awotide, 2021). Efforts at encouraging improved cooperatives involvement still appear to have achieved limited success, especially among rural farmers. It is against this background that this paper examines improved cooperative participation as the panacea for technical efficiency of cassava farmers in post-COVID Nigeria.

Conceptual Clarifications

Concept of Cooperative and Cooperative Participation

Agricultural cooperatives have for a very long-time assisted farmers in crop production. Cooperatives from their antecedents are suitable vehicles for mobilization of resources for agricultural development. A multi-purpose cooperative is one form of cooperatives that are providing different services to better economic activities of her members. Their general tasks have been provision of farm inputs, credit and other activities which helps to enhance agricultural production. There is conventional belief that declining agricultural production could be arrested through active cooperative involvement (Nwezi & Umehali, 2021). Within Africa,

there is growing interest in supporting agricultural cooperatives as a platform for enabling vulnerable smallholder farmers to secure sustainable livelihoods.

Cooperatives have long been in existence and serve the interests of many in various societies. Globally, there are over 750,00 cooperatives that are serving about 730 million members, while over 48,000 cooperatives serve 120 million people in the United States alone (Ortmann & King, 2007). They provide services such as financial, equipment and farm supplies, marketing of agricultural products, consumer goods, utilities (e.g., electricity, telephone), housing, and others. Although cooperatives are common in many parts of the world, there is growing interest in supporting agricultural cooperatives and cooperative union development as a platform for enabling vulnerable smallholder farmers to secure sustainable livelihoods (Barton, 2010). This is because agricultural cooperatives hold much potential to help economically weak farmers to improve their livelihoods standard (World Bank, 2009).

Efforts have been made to profile cooperatives with suitable meaning and interpretation. International Labour Organization (ILO, 1990) conceived a cooperative as an association of persons that voluntarily come together to achieve a common end through the formation of a democratically-controlled organisations, making equitable contributions to the capital required and accepting a fair share of the risks and benefits of the undertaking in which the members actively participate. Similarly, a cooperative was described as a voluntary, democratic, autonomous association of persons, whose purpose is to encourage members to grow in community and to act collectively both for the intrinsic value of being part of a living community and to overcome their problems of economic dependency and need by providing access to and ownership of the means of subsistence and welfare (Agba, Attah & Ebong, 2015). According to Alufohai and Ahmodu (2005), agricultural cooperatives are associations that unite agricultural producers for production or other activities needed by members (such as processing, marketing or supply).

Historically, agricultural co-operatives are structured for 'member use', whereby the co-operative is a user-owned, and controlled form of business in which benefits are derived and distributed on the basis of use (Gray, 2016). In summary, Dunn (1988) captured the usage aspect of co-operatives in three principles:

1. The User-Owner Principle: Those who own and finance the co-operative are those who use the co-operative.
2. The User-Control Principle: Those who democratically control the co-operative are those who use the co-operative.
3. The User-Benefits Principle: The co-operatives sole purpose is to provide and distribute benefits to its users on the basis of their use.

Liebrand and Ling (2014) posit that the key to operating a successful co-operative is for it to perform functions and provide services needed and desired by the member-owners to their satisfaction. This suggests that where a cooperative falls short of these basic principles, it may find it difficult to achieve its set objectives.

Furthermore, agricultural cooperatives play important roles in the mobilization and distribution of credit to farmers. It also provides members with a wide range of services such as credit, health, recreation and housing facilities (Bhuyan, 2007). Agricultural cooperatives are also useful in the dissemination of information about modern technical practices. They can enhance functional education to members in the areas of production, processing and marketing of agricultural produce. The education of cooperative members could be formal where members are trained in courses like accounting and farm management. Agricultural cooperatives help to reduce inequality and promote equitable sharing of the costs and benefits of sustainable development.

Over 85% of the total cassava production in Ogun State is cultivated by smallholder farmers (The Guardian, 2020). It stressed that the state has over 200,000 estimated cassava farmers, however, lesser proportion are registered with the appropriate authorities or agricultural organizations. This does not only endanger their technical efficiency and production, but also their managerial capacity of the farm produce.

Agricultural Production in Post-COVID Era

In a country like Nigeria where food insecurity has been a challenge prior to the compound impact of COVID-19, there exists sparse research documentation of this dynamics. Over 70

percent of Nigeria's population live in rural areas and are responsible for about 75 percent of Nigeria's food production. This is comprised of mostly older persons and people having other health issues, thereby making them more susceptible to the deadly virus. Majority of the rural populace are predominantly smallholder farmers who produce staple food crops such as rice, yam, cassava, maize, sorghum, cowpea, millet, cowpea and vegetables (Bidemi, 2020). This makes it imperative to highlight agricultural activities during the early stages of the pandemic and possibly chart the way forward in the post-COVID era.

COVID-19 is the acronym for the novel dreaded corona-virus disease that was discovered in December 2019 at Wuhan, China. The alarming levels of inaction towards the virus made the World Health Organization (WHO) declare it a global pandemic on March 21st, 2020 (Ghebreyesus, 2020; WHO, 2019). The virus was declared a pandemic because it was an infectious disease with increasing person-to-person spread in multiple countries at the same time.

Nigeria was one of the few African countries that first recorded COVID-19 cases in the continent and among those that experienced significant economic disruptions because of the pandemic. In an effort to curtail the spread of the virus, lockdown and physical distancing were among other measures adopted by the government. This brought about mobility restrictions and avoidance of close contact with people (Federal Ministry of Budget and National Planning - FMBNP, 2020).

The extreme control measure left many Nigerians, especially farmers without alternative access to their economic activities. Agriculture is the mainstay of the nation's economy, and contributes more than 30% of the total annual Gross Domestic Product (GDP), employs about 70% of the labour force, accounts for over 70% of the non-oil exports and, most importantly, provides over 80% of the food needs of the country in a bid to ensure food sufficiency (Adegboye, 2004). Cassava farmers, just like others, were unable to move about to source for farming inputs or even to go to their farms. The spillover effects of the hindered access to farm lands were rising spate of food cost and food shortage. In other words, since there were restrictions and inadequate cultivation, insufficiency of basic foods to meet high demand occasioned by growing population of the country becomes glaring.

A study conducted by Reuters (2020) revealed that crops of several farmers in Nigeria were rotting in fields or at depots due to logistical challenges occasioned by the pandemic. In addition, access to inputs, especially seeds, was hindered. According to Global Alliance for Improved

Nutrition (GAIN, 2020), the lockdown control strategy seriously affected harvest, processing and supply flow of food value chain, like cassava, rice etc. Mobility restrictions and lockdowns disrupted processes involved in the valuation and release of new seed varieties, as well as timely production of early generation seed and the planning of its supply.

Ogun State accounted for about 14% (6.28 million tonnes) and over 16% total annual national cassava production in Nigeria as at 2011 and 2017, respectively (OGADEF in Hoback, Olori, Collins-Chibeze & Rosales-Rogge, 2015; Adeogun, Adeleye, Fashola & Osabuohien, 2017). They posited that the State government's intervention policies have contributed to the increase in output levels. However, this progress dropped significantly in 2020 due to impact of Covid-19. FAO (2020) reported that the virus did not only destroy farm inputs and produce, but also brought about intense hunger and negative coping habits due to non-availability of foods. World Bank (2021) noted that many farmers' crops that were due for harvest were destroyed and farm produce that were due for marketing got spoilt as a result of restriction in movement. This informs of the capacity level and technical efficiency of the farmers. In other words, the farmers were not efficiently prepared with the right capacity to preserve their inputs or produce and again appears lacked market networking that could have aided sales.

Technical Efficiency

Efficiency of production is a measure of how much output have been obtained with a given level of inputs. It is also the ratio of output from inputs. Farrel (1957) as cited in Audu, Girei and Umar (2020) classified efficiency into technical, allocative and economic. The concept of technical efficiency which is the focus of this paper entails comparison between observed and optimal values of output and inputs of a production unit. It is concerned with how closely the production unit operates to the frontier of production possibility set (Audu et al, 2020).

Technical inefficiency was conceptualised as a situation in which actual output produced from a given input combination is greater than the maximum probable output (Fan, 1999). In another view, technical efficiency was referred to the ability of firms to employ the best practices in their production processes, so that not more than the necessary amount of a given set of inputs is used in producing the best level of output (Carlsson, 1972). More succinctly, Olayide and Heady

(1982) opines that technical efficiency is the measure of a firm's success in producing maximum output from a given set of inputs.

Studies have established that a farmer's ability to be technically efficient or savvy to improved agricultural technologies is a determinant of notable factors, amongst of which is level of cooperative involvement. Alufohai and Ahmodu (2005) were of the view that cooperative participation provides a farmer the opportunity to acquire new knowledge that can help eliminate drudgery or obstacles and boost agricultural production. In another vein, Okoye, Abass, Bachwenkizi, Asumugha, Alenkhe, Ranaivoson, Randrianarivelo, Rabemanantsoa and Ralimanana (2016) posits that gender, age and educational level can significantly influence technical efficiency of cassava farmers. Where female cassava farmers were more technically efficient than their male counterparts, the former may be constrained by cultural factors from playing a more active economic role and technical development, as well as restrain on the lands they farm. An increase in age could lead to a decrease in technical efficiency. This implies that younger farmers are more likely to be technically efficient than the elderly or older farmers. This is understandable, as older farmers are more likely to be less energetic; this leads to lower technical efficiency and poor productivity.

Furthermore, uneducated farmers were observed to be more technically efficient than their educated counterparts (Okoye et al, 2016). Similarly, Simonyan, Umoren and Okoye (2011) align with this view as they argued that when women education level increases, there is the possibility of diverting their skills to off-farm employment opportunities. The reason for this unexpected outcome is probably that the more educated farmers tend to work part-time on their farms since they may have other livelihood options, while their uneducated counterparts work committedly in their farms as these could be their major source of livelihood. By so doing, they get perfected since it is their main occupation.

Cassava Farmers and Production in Ogun State

Ogun is one of the States with a high stake in cassava production in Nigeria. Analysis of the State's agricultural production has shown that Ogun has competitive advantages in the cultivation of food crops such as cassava (The Guardian, 2020). It argues that the State's

proximity to Lagos, the industrial and commercial capital of Nigeria and by extension, Africa, strategically place her in a vantage position for agricultural investments, value chain development and produce exports.

Ogun State as an agro-allied investment destination in Nigeria is housing notable cassava processing value-chain industries, like the Allied Atlantic Distilleries limited (AADL). The industry uses about 75 million tonnes of cassava yearly to produce about 9 million litres of ethanol annually. This is just about 4 percent of Nigeria's 400 million litres annual ethanol consumption (Nnabuife, 2017). Therefore, there is still huge gap in meeting the remaining 96 percent local demand and this informs of the lucrative fortune that can be accruing through improved cassava production in the State.

One of the current State administration's priority crops is cassava. Realising the strength of the State in closing food production gaps and saving the nation's economy from collapse, as well as the foreign exchange crisis associated with food importation, the government has placed its focus on the sector as a pillar upon which the economy of the State could solidly rest (Guardian, 2020). The overall objectives of the State's agricultural policy are to;

- i. achieve self sufficiency in food production,
- ii. provide raw materials for agro-based industries,
- iii. generate employment opportunities, and
- iv. attain desirable levels of exports in order to improve the country's foreign exchange earnings (Ogun State Ministry of Agriculture, 2021).

Despite this noble agenda, several odds however still work against the efforts to produce abundant food for not just the State, but the nation in general. These odds amongst others are impact of Covid-19 and poor technical efficiency which has made cassava production levels lesser the demand for local markets and requirements for processing industries (Akerere et al, 2019).

Theoretical Framework

Agricultural Development Theory (ADT) is the theoretical underpinning of this paper. The theory was postulated by George Norton, Jeffrey Alwang and William Masters. The agricultural development theory tries to show how the interaction between factors of production and effective supervision of good government policies could boost food production and lead to development (Norton, Alwang & Masters, 2016).

The ADT is an agriculture-centric economic development theory that explains the forces in an economy that lead to agricultural change. It looks at existing agricultural systems in developing nations and means of improving the systems to increase its contribution to national development (Agbaeze, Ohunyeye, Obamen & Ibe, 2020). The theory posits that the basic sources of growth such as labor, increase in specialization and technological progress could be stimulated and combined to increase agricultural growth or outcome (Norton et al., 2016).

In application to this paper, the theory infers that production resources such as land, money, technical implements and labour can be utilised in harnessing cassava production. Through proper assessment of the farmers' technical efficiency and re-training initiative, their production capacity can be improved, especially when exposed to cooperative resource. This is because during the COVID-19 pandemic there was glaring distortion in the relation among production resources. The restriction measures disconnected one from another, example the inability of the farmer to access his/her farmer or the processing plants and markets substantiated this narrative. Therefore, to step up capacity operations or efficiency of the farmers bring to fore the need for proper supervision, evaluation and skill empowerment of the farmers in line with modern best practices. These and many more are what agricultural cooperatives stand to offer to enable farmers do better, even in the face of challenges.

Nexus between Cooperative Societies and Technical Efficiency of Cassava Farmers

Studies have explored the roles of agricultural cooperatives in enhancing use of improved technologies, economic performance, land management practices and welfare of farmers (Zhang, Sun, Ma & Valentinov, 2019; Ahmed & Mesfin, 2017; Ito, Bao & Su, 2012). A study conducted by Michalek, Ciaian and Pokrivcak (2018) indicates that farmers who belong to agricultural

organizations have higher value-addition, profitability, labour productivity and employment than non-cooperative members.

In a similar vein, Wossen et al as cited in Olagunju, Ogunniyi, Oyetunde-Usman, Omotayo and Awotide (2021) established the positive impacts of cooperatives on improved agricultural technology utilisation and household welfare in rural Nigeria. In addition, Nwankwo, Ewuim and Asoya (2013), as well as Ma, Renwick, Yuan and Ratna (2018) clearly informed that cooperative membership is not only a viable tool for increasing production, but also helps to maximise outcomes by facilitating efficient use of inputs. This suggests that cooperative membership is the panacea for productive agricultural venture.

Be it cassava farmers or any other agricultural activity, it has been established that cooperative participation would enhance the production and technical efficiency of the farmers. This is in view of the fact that cooperatives have the capacity to avail cassava farmers with new ideas, improved technologies, seedlings and as well as credit facilities. This implies that the individual farmer may not derive such benefits when operating in isolation or alone.

Research Design

This study adopted survey research design. The choice of this form of design is that it enables the use of quantitative tool in data collection. It also helps to sample opinion and interpretative in nature (Kothari, 2004). This design also enables a researcher to be a participant observer and provides first hand empirical data.

Area of the Study

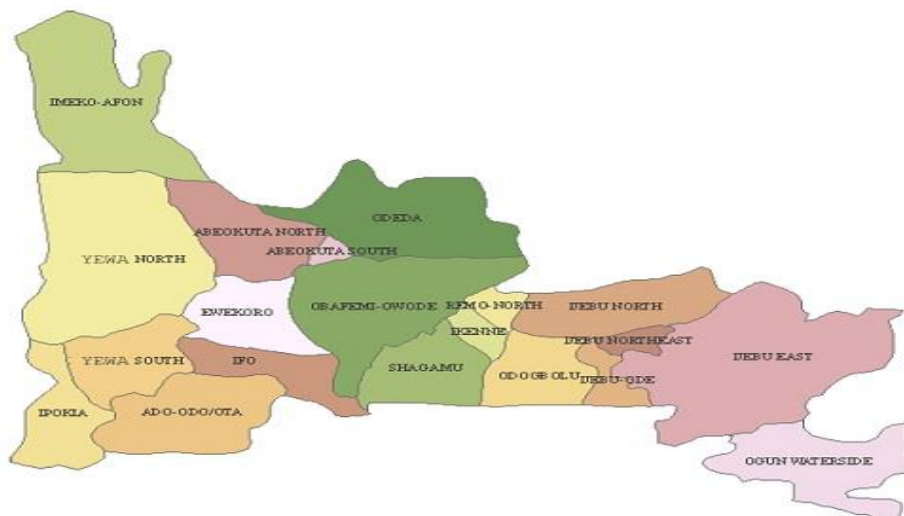


Figure 1: Map of Ogun State with LGA's

Source: Ogun State Government (2021)

Population of the Study

The population of this study is two thousand, three hundred and eighteen (2,318) members of sixty-six registered agricultural cooperatives that specialises in cassava production and processing in Ogun State. The data was generated from the Ogun State Agricultural Development Programme (2021).

Sample Size Determination

The sample size for this study is three hundred and forty-one (341) cooperative cassava farmers in Ogun State. This was determined using Taro Yamane (1967) formula. The calculation is done thus;

$$n = \frac{N}{1 + N(e)^2}$$

- Where;
- n = Desired sample size.
 - N = Population of study (members).
 - 1 = Unity, always constant in value.
 - e = error margin (5% or 0.05)²

Thus;

$$n = \frac{2318}{1 + 2318(.05)^2}$$

$$\frac{2318}{1 + 2318(0.0025)}$$

$$\frac{2318}{6.795}$$

$$n = 341.$$

Sources of Data

This study sourced data from primary and secondary sources. Primary data is a source of information generation in research through surveys, interviews, experiments etc. Survey is the use of questionnaire and in this particular study data were sourced through a well-structured questionnaire. On the other hand, secondary data is a form of data collected from documented evidences or records different from primary source. They include information from organization records, publications etc. In this study, secondary sources of data were from libraries, journals, textbooks, cooperative materials, agricultural organisations and internet.

Summary of Findings

The survey study made a number of findings and they are summarised as follows;

1. Socio-economic factors, such as age, educational level, household size, farming experience, years of cooperative membership and income accounted for about 82% of the variations in technical efficiency of the farmers; hence, F-ratio of the equation 21.519 was significant@ 1% level.
2. Farm inputs such as credit facilities, improved cassava stem, processing techniques, information on modern techniques, fertilizer, pesticide/insecticides, contact access and herbicides caused 70% variations in the production of cassava among the farmers, thus, the F-ratio of the equation 19.281 was significant@ 1% level.
3. Marketing strategies such as sell on the roadside, sell in the usual open market outlets in villages, on-farm sell for the buyer to harvest, marketing alliance on discounted prices and

processing (value addition) facilitated about 81% sell of cassava among the cooperative farmers, hence, the F-ratio 16.426 was Significant@ 1% level.

4. The credit obtained by the farmers differ significantly by agricultural zones; hence, there is a significant difference in credit obtained by cooperative cassava farmers in Ogun State (0.024*, 0.000*, 0.004*, @ $p < 0.05$).
5. Production constraints such as high cost of improved technologies, poor storage/processing facilities, lack of extension services in providing information on new technologies, problem of weeds/inadequacy in managing weeds, high cost of labour/reliance on family labour, inaccessibility of credit facilities, reliance on rudimentary implements, high cost of fertilizer, lack of training on farm resource management, problem of pests and diseases influenced about 66% of the challenges militating against the farmers technical efficiency, hence, the F-ratio 23.839 was Significant@ 1% level.

Conclusion and Recommendations

Many farmers in Nigeria are not only operating outside of agricultural cooperatives, but are also disadvantaged on modern technological ideas for improved production. The outbreak of COVID-19 pandemic exacerbated their frustration and as well exposed their inefficiencies. The adverse effects in Nigeria are much and more devastating as it relates to food production, processing and availability, especially cassava. It also interrupted food supply chains, cash flow, weakened import/export demands for food products and inability to meet delivery needs. This was occasioned by the fact that majority of the farmers are not in cooperatives; hence, they lack the requisite technologies for processing, preserving and even marketing. Consequently, crops, inputs like cassava stems and produce that were ordinarily to be preserved through harvest and processed into finished products got damaged. This therefore, does not only transcend to losses in income but also amount to food wastage as well as worsening food insecurity crisis in the country. In conclusion therefore, the paper submits that through effective cooperative membership and patronage of cooperative services, technical efficiency of cassava farmers may not only be enhanced but their productivity would improve. To this end, it recommends that;

1. Cassava farmers should be made to understand the importance of cooperative societies and usefulness of being a registered member. This is in view of the possibility that many of these

farmers who are not members might be dwelling on erroneous assumptions or unguided perceptions about cooperatives.

2. The government should encourage farmers to join agricultural cooperative societies. This is to enable them learn new techniques of farming and pull resources together to solve challenges that ordinarily they would not individually.

3. The food shortage crisis which has increased the prices of food commodities in the market since post-COVID should be addressed by the government. This can be done either by bringing out enough staples from the national food reserve bank or through short importation. This is in view of the fact that when there is sufficient supply of foods in the market, demand and supply matrix would control the price.

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