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ADOPTION OF IMPROVE YAM PRODUCTION TECHNOLOGIES IN MEME DIVISION, SOUTH WEST REGION, CAMEROON

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ABSTRACT

This study assessed farmers' awareness of improve yam technologies, adoption of the technologies and constraints to adoption. The major yam producing zones in Meme (Kumba and Mbonge) were selected. Kumba-Mbeng and Buea-Road (Kumba) and Mbalangi and Mile 40 (Mbonge) were purposively chosen on the criteria of quantity of yams produced, security and accessibility. Through snowball sampling technique, a sample of 90 farmers was constituted. A questionnaire was used for data collection and collected data analyzed using SPSS software and Microsoft Excel. The results revealed that 53.3% of farmers were aware of improve yam production technologies. Organic manure was the most known technology (62.5%) while the least known was the use of ropes as vine support (20.8%). Organic manure was the most adopted technology (60.5%) while the yam minisett was the least adopted technology (13.1%). The main constraints to adoption were a lack of follow-up by extension agencies and insufficient information to convince farmers. Despite poor acquisition and practice of these technologies, extension agencies should be encouraged to increase the level of communication and implementation by farmers.

Keywords: Adoption, Improve Yam Technologies, Yam Production, Yam Farmers.

1. INTRODUCTION

Yam (*Dioscorea* species) has contributed enormously to food security especially in Sub-Saharan Africa because of its role in providing nutritional benefits and income (Obidiegwu *et al.*, 2020). Africa accounts for 97% of the world's production far beyond the Americas (2%) and Oceania (1%) (FAO, 2019). Cameroon with an annual production of 648,407 MT (0.9%) is ranked sixth in the West African yam zone (Azetel *et al*., 2019). Though its uses are diverse, yam is traditionally used as food and more than five million people in yam-growing countries directly depend on the yam value chain for their food security and livelihoods (Mignouna, *et al*.,2020). Cultivation of yams by rural households contributes to household and local food supply; income generation both on-farm and off-farm through value addition and marketing; and production of planting materials for personal cultivation as well as to generate additional income from the sale of surplus seed yams (Acheampong *et al*., 2019)

Yam is mostly propagated vegetatively, using tubers, which serve as food and this often creates scarcity of planting material since the smallholder farmers also consume them during periods of food shortages. Although yam has received little research attention and is considered an "orphan" crop, several recent research along the West African yam belt have demonstrated

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improved technology options for sustainable yam production (Frimpong *et al*., 2020). Adoption of improved technologies provide opportunities for poverty alleviation and nourishment. Adoption and diffusion of technologies are two interrelated concepts describing the decision to use or not use and the spread of a given technology among economic units over a period of time (Dawit *et al*., (2019). Agricultural technology adoption is an essential strategy for increasing agricultural productivity, achieving food self-sufficiency and alleviating poverty and food insecurity among smallholder farmers (Alemayehu, 2019).

It has been observed that the production system in Meme Division, Cameroon is traditionally based on shifting cultivation and used of head and tail sett which are often disease infested, thus contributing to low yields. Supply does not meet the increasing demand for the commodity in the division, region and country at large. Despite technological advancement in yam production like the use of pest and disease resistant varieties, fertilizers and yam minisett to increase yam yields, technologies remain underutilized and unexploited probably because of lack of knowledge of the improved technology, lack of effective management, high cost, inadequate supply of inputs (Akerele *et al*., 2019). Diseases and pests are constraints to yam production, affecting yield and quality of tubers in Cameroon (Azeteh *et al*.,2019). There is need to disseminate and adopt available yam technologies to augment yields, meet the food needs of the people, raise income and make recommendations. This study on adoption of improve yam production technologies in Meme Division, South West Region of Cameroon assessed farmers' awareness of improve yam technologies, adoption of the technologies and constraints to adoption.

2.RESEARCH METHODS

The study was carried out in Meme Division located on latitude 4° 50' 60" North of the Equator and longitude 9° 20' 60" East of the Greenwich Meridian. The major yam producing zones in Meme (Kumba and Mbonge) were selected.

The study population was constituted of individuals cultivating yam in these selected subdivisions. A multistage sampling procedure was adopted in selecting respondents. First, the yam farmers in Meme were divided into two clusters (Kumba and Mbonge clusters). Kumba constituted the urban cluster and Mbonge, the rural cluster. Purposive sampling technique was used to select the rural and urban sample units. This selection was based on criteria of the quantity of yams produced, security and accessibility. Two villages in Mbonge (Mbalangi and Mile 40) constituted the rural cluster while Kumba Mbeng and Buea road area (Kumba) made up the urban cluster. Since the population of individual yam farmers in the different clusters was unknown, the snowball sampling method, where an individual contacted assists in locating other farmers, was used. This methodology gave a sample of 90 farmers (30 from the urban cluster and 60 from rural cluster) who were administered the questionnaire used as primary data collection tool. The questionnaire had 3 sections made up of open and close ended questions.

Section A captured information on awareness of improve yam technologies. This consisted of farmers responding with a "yes" or "no" to the question on awareness of improve technologies. Those who said "yes" were further asked to recount yam technologies they were knowledgeable of.

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Section B was focused on adoption of the known improve technologies mentioned by farmers in section A. It was assumed that only farmers who responded with a "yes" on awareness of improve technologies and mentioned at least one of these technologies took measures to adopt them. This category of farmers was referred to as adopters.

Section C was based on adoption constraints. Both farmers who had adopted the known technologies (adopters) as well as those who were knowledgeable of improve technologies but had not adopted any (non-adopters) were of interest.

The data collected by the questionnaire were analyzed using the IBM SPSS software and the Microsoft Excel.

3. RESULTS AND DISCUSSIONS

Awareness of Improve Yam Production Technologies

Figure 1 shows that 53% of the farmers were aware of improve yam technologies.

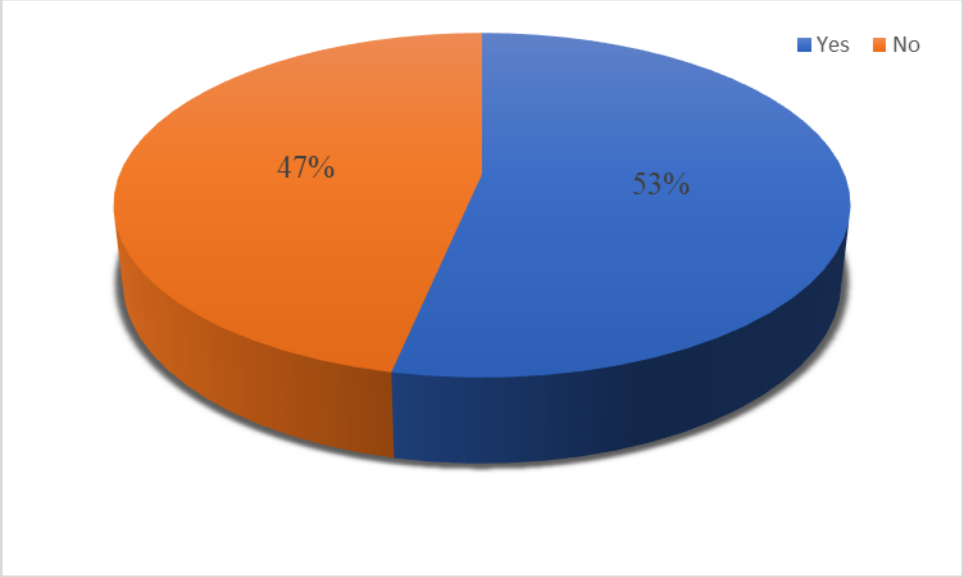

Figure 1: Awareness of improve yam production technologies

The different improve yam production technologies known by farmers are presented on Table 1. It was observed that organic manure was the most known improve technology (62.5%) among yam farmers. Results also showed that 37.5% of the farmers were knowledgeable of the mulching technology. Few farmers were aware of pest and disease varieties (22.9%), the use of ropes for vine support (20.8%) and the yam minisett technology (25%). Knowledge equips the farmer for the task and the outcome of his action. Innovations in yam farming enhance production and assure the food and monetary requirements of the household. Awareness of an improve technology is a pre-requisite to its adoption and it is expected that only those who are aware of an innovation can take measures to adopt. However, awareness does not necessarily lead to adoption because a farmer may be aware of an innovation but decides not to adopt it

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especially when it does not meet his/her needs and the innovation decision is optional and not authoritative.

Table 1: Improve yam production technologies known by farmers

List of technology	Frequency	Percentage
Yam minisett	12	25
Mulching	18	37.5
Use of ropes as vine support	10	20.8
Pest and disease resistant varieties	11	22.9
Organic manure	30	62.5

When asked the source of information on yam production innovations (Figure 2), 58.4% of the respondents mentioned farmer-to-farmer extension while 38.2% made reference to extension services. Some of the farmers (3.4%) alluded other sources such as friends and relations. Farmer to farmer extension is fast gaining grounds as farmers tend to listen and have more confidence in other farmers with whom they share common experiences and challenges. They collaborate through information dissemination to find solutions to their problems. As stated by Uma *et al*., (2021) the farmer led informal and unstructured diffusion of proven agricultural technologies takes off and results in its spread among other farmers through social interactions and networks. Active adoption where a farmer takes up an innovation and influence other farmers to do same has a higher diffusion effect than the passive adoption where the farmer who adopts does not influence other farmers to do same. Agricultural extension services are not very active in information dissemination in the study area. Khodran *et al.*,2019 also observed that extension services are not able to effectively satisfy the farmers' needs to improve their farming methods.

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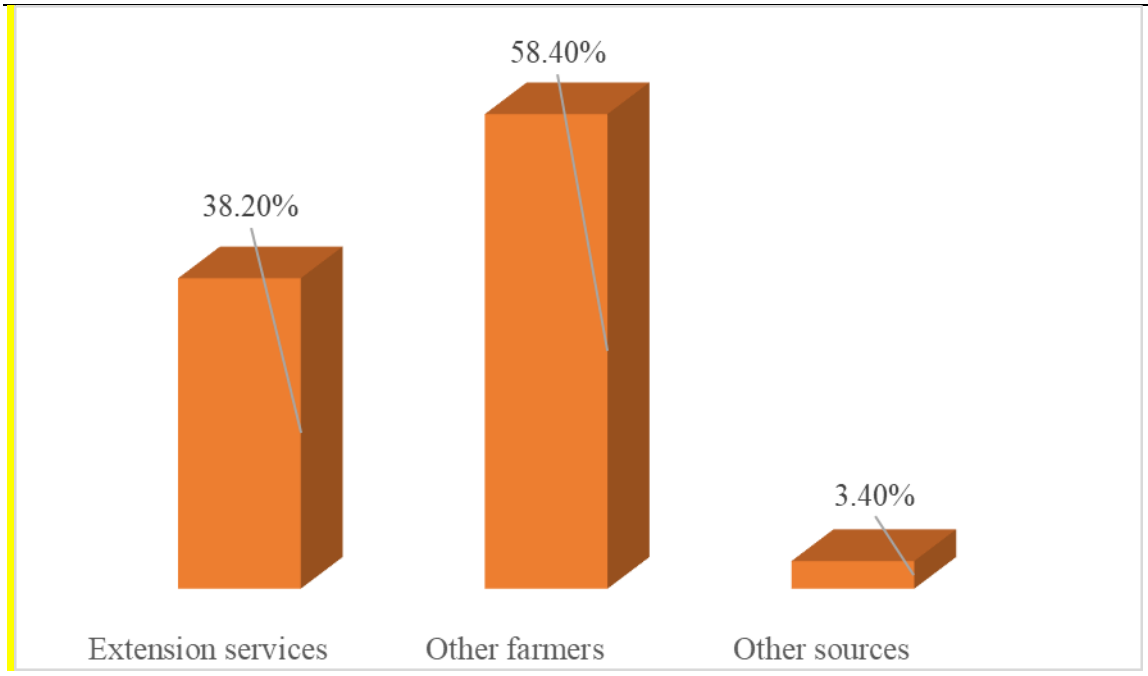

Figure 2: Source of information on improve yam technologies.

Adoption of Improve Yam Technologies

Table 2 reveals that organic manure was the most adopted technology (60.5%). Application of organic manure is the need of the hour to support soil fertility by enhancing the carbon content of the soil and therefore uplifting the agricultural production while minimizing environmental impacts (Urra *et al.*, 2019). The simplicity, availability and low cost of organic manure gives it an added advantage over other innovations. This was closely followed by mulching (23.6%). Mulching provides many benefits to crop production such as protecting the roots of the plants from heat and cold, reducing salinity and weed control and improving the yield and quality of the crop (Abhay & Shwati, 2021). Just like organic manure, the technology is affordable and simple. The use of ropes as vine support was adopted by 15.8% of the farmers, yam minisett by 13.1% of the farmers and pests and disease resistant varieties by 13.1% of the farmers. Even though the yam minisett technology had long been introduced in Cameroon's seed system through the Ministry of Agriculture, in collaboration with the National Agricultural Extension and Research Program (PNVRA) and the Institute of Research for Agricultural Development (IRAD), its rate of adoption remains surprisingly very low. As accentuated by Ahmed (2022), the ability of the agricultural sector to promote food security is intrinsically related to the adoption of modern productivity-enhancing innovations.

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Table 2: Improve yam technologies adopted by farmers

List of technologies	Frequency	Percentage
1- Yam Minisett	5	13.1%
2- Mulching	9	23.7%
3- Use of ropes as vine support	6	15.8%
4- Pests and disease resistant variety	5	13.1%
5- Organic manure	23	60.5%

Constraints to Adoption of Improve Yam Production Technologies.

Adopters and non-adopters (Figure 3) faced constraints adopting the different innovations in yam production. The high cost of the technology was the adoption constraint faced by majority of the adopters (35.4%). The cost of an innovation may slow its adoption rate (Odojuma *et al*., 2019). Other constraints faced by adopters were insufficient follow-up from extension agency (19.6%), insufficient information on the application of the technology (27.5%) and non-profitability of the technology (17.5%). Farmers who have opted for an innovation should be furnished with the relevant information on its applicability. This keeps them abreast with the consequences of the innovation be it direct or indirect, desirable or undesirable, anticipated or unanticipated. Constraints sometimes result in disenchantment discontinuance (cancellation of the adoption process).

Adoption constraints identified by non-adopters were, lack of follow-up from extension agency (41.2%), insufficient information to convince and encourage the adoption of the innovation (39.6%) and lack of financial resources to adopt innovations (19.3%). Lack of follow-up by extension agency is a call for concern given the centrality of the agency in the diffusion and adoption of innovations. This renders questionable the efficacy of the extension system and its services. A similar assertion was made in Ambaye *et al.*, (2021) that access to agricultural extension services is not as it ought to be.

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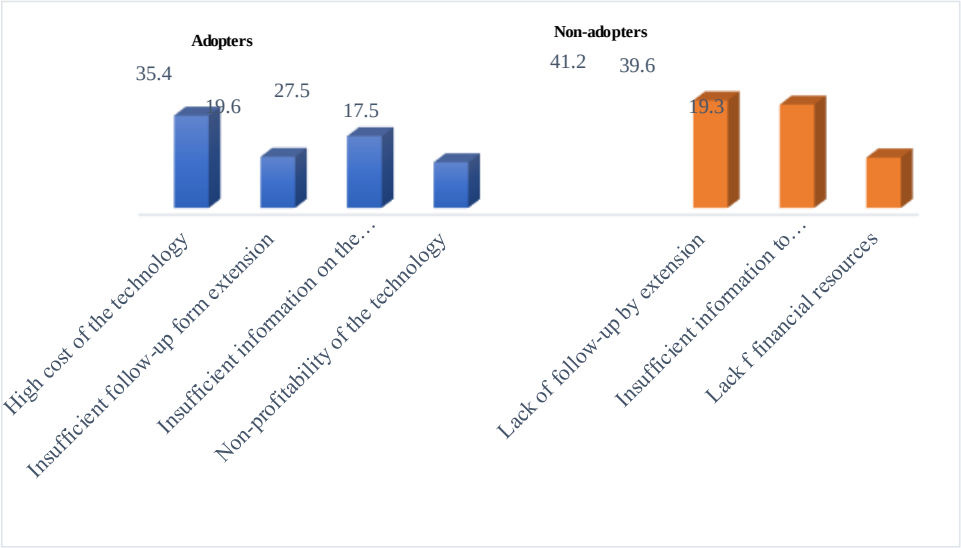

Figure 3: Constraints faced by adopters and non-adopters of improve yam technology

CONCLUSION AND RECOMMENDATIONS

Many farmers are not aware of the innovations in the yam sector. Not all those knowledgeable about improve yam technologies have adopted them. There is need to sensitize farmers on the different improve yam production technologies which will enhance production and farm income. Continuous dissemination and provision of training is recommended to enhance the adoption efforts into efficient yam production. Resilience of extension agency is necessary to fulfil its objective of information dissemination, augmentation of agricultural production and living standard of farm families.

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Conflict of interest

No competing interests exist.

Authors' contributions

JDT (50%) designed the study, performed the statistical analysis, wrote the protocol and the first draft of the manuscript

RNN (50%)designed the study, performed the statistical analysis, wrote the protocol and the first draft of the manuscript.

AKA (100%) collected the data of the study.

TJD (100%) managed the literature searches.

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All authors read and approved the final manuscript.

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