



# Perception On The Impact Of Adopting Improved Maize Technology On Farmers' Household Welfare In Yobe State, Nigeria

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## ABSTRACT

The study aimed at examined the Perception on the impact of adopting improved Maize production technology on farmers' household welfare in Yobe State, Nigeria. Five (5) research questions in line with the objective of the study were formulated to guide the study. Descriptive Survey Research Design was adopted for the study. The population of the study was comprises of all Maize farmers in Yobe State for 2022/2023 production year. The study was use a multi stage sampling procedure to select the respondents for the study. The first stage was involved the purposive selection of ten (10) Local Government Area based on their massive production of Maize, absence of security threat and proximity to the researchers. In the second stage, five (5) wards were randomly selected from each of the selected Local Government Area. This means that fifty (50) wards from the ten (10) Local Government Areas. Finally, ten (10) Farming Households using improved Maize production technologies were randomly selected from each ward. This gave the total sample size up to 500 respondents. Structured was the instrument used to collected data for the study. The split – half method of reliability was used and a reliability co – efficient ( $r$  – value) of 0.70 was obtained. The data collected for the study was analyzed using descriptive statistics percentages and mean and standard deviation. The findings of the study revealed that, planting of improved varieties of maize, selection of disease-free planting materials and selection of an appropriate site for maize production are some of the level of awareness of improved maize production technologies among farmers in Yobe State. The findings of the study also revealed that, education level of farmers, farmers' farm size and farmers' level of income are some of the determinants of the adoption of the improved maize production technologies. The findings of the study further revealed that, increased maize yields, improved farmer incomes, reduction in production costs and improved marketability are some of the economic impact of the adoption of the improved maize production technologies. The findings of the study also revealed that, high cost of improved seeds, adulteration of chemicals and land tenure problem are some of the constraints in adopting improved maize production technologies in Yobe State. It was recommended that, there is need for adoption of improved maize varieties can be enhanced through the increased availability of improved maize varieties as some farmers are very much interested in cultivating these varieties but do not have access to the seeds.

**Keywords:** farmers, household welfare, maize, production technologies

## INTRODUCTION

Agriculture plays an important role in economic growth, enhancing food security, poverty reduction and rural development. It is the main source of income for around 2.5 billion people in the developing world (FAO, 2017). Smallholder agriculture is identified as a vital development tool for achieving Millennium Development Goals, one of which is to halve the people suffering from extreme poverty and hunger by 2015. However majority of smallholder farmers relies on traditional methods of production and this has lowered the level of productivity. For instance Over 70% of the maize production in the majority of developing countries is from smallholders who use traditional methods of production (Obayelu & Damilola., 2018). These farmers generally obtain very low crop yields because the local varieties used by farmers have low potential yield, most of the maize is grown under rain-fed conditions and irrigation is used only in limited areas, little or no fertilizers are used and pest control is not adequate. Therefore, increased agriculture productivity is one of the strong options for stimulating economic growth, reducing poverty, and improving food security. The government through the National Acceleration Food Production Programme (NAFPP) in 1972 instituted the need for agricultural technology development in Nigeria (Issa, Kagbu & Abdulkadir, 2016). The purpose was to enhance technology transfer with respect to priority crops like maize, wheat, sorghum, cowpea and cassava to the rural farmers. The development of agricultural technology in Nigeria led to the creation of agricultural technology centers or agricultural research institutes; and the major role is to breed improved seeds of crops that are early maturing, high yielding, resistant to pests and diseases and are adaptable to local environment.

Agricultural technologies include all kinds of improved techniques and practices which affect the growth of agricultural output. According to Owwoye (2017) the most common areas of technology development and promotion for crops include new varieties and management regimes; soil as well as soil fertility management; weed and pest management; irrigation and water management. By virtue of improved input/output relationships, new technology tends to raise output and reduces average cost of production which in turn results in substantial gains in farm income (Ahmadu & Edeoghon, 2018).

Adoption of improved agricultural technologies has been associated with: higher earnings and lower poverty; improved nutritional status; lower staple food prices; increased employment opportunities as well as earnings for landless labourers Adoption of improved technologies is believed to be a major factor in the success of the green revolution experienced by Asian countries (Tesfaye, Bedada & Mesay, 2016). On the other hand, non-adopters can hardly maintain their marginal livelihood with socio-economic stagnation leading to deprivation (Jain *et al.*, 2009). A new agricultural technology that enhances sustainable production of food and fiber is therefore critical for sustainable food security and economic development. This has made the dynamics of technical change in agriculture to be an area of intense research since the early part of twentieth century.

These technologies are particularly relevant to smallholder farmers in developing countries because they are constrained in many ways, which makes them a priority for development efforts. These farmers for instance, live and farm in areas where rainfall is low and erratic, and soils tend to be infertile. In addition, infrastructure and institutions such as irrigation, input and product markets, and credit as well as extension services tend to be poorly developed (Afolami, Obayelu, & Vaughan, 2015).

Improved agricultural technologies reduce poverty by increasing rural agricultural incomes, reducing food prices, facilitating the growth of non-farm sectors, and by stimulating the transition from low productivity subsistence agriculture to a high productivity agro-industrial economy. According to Audu & Aye, (2014), the potential for poverty reduction through the above transmission mechanisms depends on the extent to which agricultural productivity can be increased. Agricultural innovation can have both direct and indirect effects on poverty. Direct effects of technological innovation on poverty reduction are those productivity benefits enjoyed by the farmers who actually adopt the innovation. The benefits typically manifest themselves in form of higher farm profits. The indirect effects are productivity-induced benefits passed on to others by the innovating farmers. These may comprise lower food prices, higher non-farm employment levels or increases in consumption for all farmers. Which of these effects is dominant depends largely on the speed with which farmers adopt new technologies and on whether or not the affected households are net food buyers or sellers.

The impact of the adoption of a new technology can be studied from the pro-poorness of the new technology. The adoption of a new technology is pro-poor if it benefits the poor relatively more than the non-poor (Zongoma, 2015). Obviously, such a technology must be affordable by the poor. Moreover, its benefit must be substantial relative to its cost (including the adoption risks it involves). Some of the literatures on the impact of anti-poverty programs have focused on performance, rural poverty and income. Most of these studies have revealed positive relations between technology adoption and livelihoods (Owoeye, 2017). However, Nchembi (2017) observed that the adoption of improved maize varieties only modestly increased the crop incomes of adopters in Tanzania.

In addition, different methods have been developed and used in the literature to assess the impact of programs, policies and adoption of improved agricultural technologies on poverty reduction. Notwithstanding, the results have been varied. For example the Propensity Score Matching (PSM) methods was used by Mendola (2006), to assess the impact of agricultural technology adoption on poverty in Bangladesh and concluded that the adoption of high yielding improved varieties has a positive effect on household wellbeing in Bangladesh. Similarly, Kijima *et.al.* (2008) carried out a study on the impact of New Rice for Africa (NERICA) in Uganda and established that NERICA adoption lessens poverty without deteriorating the income distribution. The results of Diagne (2006) on the assessment of the impact of NERICA adoption on rice yield in Cote d'Ivoire proved a positive and significant increase in yield particularly on the female farmers. Recently, the outcome of the research conducted by Dontsop-Nguezet, Diagne, Okoruwa, & Ojehomon (2011) on the impact of Nerica rice adoption on farmers shows that adoption of NERICA varieties has a positive and significant impact on farm household income and welfare measured by the per capita expenditure and poverty reduction in rural Nigeria.

A close assessment of the various studies on effect of adoption on poverty status of farmers shows that majority of the studies focus on an improved variety of a crop or crops. However, since there are some other improved varieties of a crop or crops that have been developed and distributed to farmers, any observed effect on an improved variety cannot be generalized on entire improved varieties adoption of such crop. Therefore this study will focus on the impact of the adoption of existing improved maize technologies on farm household welfare in Yobe state.

Maize is one of the main cereals cultivated, consumed, and marketed in Nigeria. Maize is grown in all parts of Nigeria and now forms part of the staple food in Nigeria. It contributes about 33% to the total household food consumption (Otsuka, 2016). Its importance has increased recently because of the federal governments' restriction on imported flour. Maize is the most widely-grown staple food crop in sub-Saharan Africa (SSA) occupying more than 33 million hectares each year (FAOSTAT, 2015). Maize is one of the most important staples crops in Africa accounting for almost 40% of all cereals. The crop covers nearly 17% of the estimated 200 million hectares of cultivated land in sub-Saharan Africa, and is produced in diverse production environments and consumed by people with varying food preferences and socioeconomic backgrounds. Nigeria has been reported as the tenth largest producer of maize in the world, and the largest maize producer in Africa (IITA, 2012). Apart from having a considerable potential to enhance food security and the productivity and sustainability of the crop-livestock system, maize has been found to increase annual income of farm households in Nigeria by 25% (Dugje, Omoigui, Ekeleme, Kamara, & Ajeigbe, 2009). Hence, it is currently cultivated all over the country, replacing hitherto more important cereals such as sorghum and millet in the fields. Because of such potentials of maize, production is rapidly spreading into the drier Savannah zones of West Africa. It is grown all over the country but concentrated in Oyo, Kwara, Niger, Kaduna, Nasarawa, Bauchi, Plateau, Taraba, Gombe and Adamawa (FMARD, 2015). It is an important cereal crop that has assumed the status of a cash/food crop. Maize plays a predominant role in the farming systems and diets of millions of Nigerians. It is a very versatile crop since it is used for domestic consumption in addition to its industrial use by flour mills, breweries, confectioneries and animal feed manufacturers.

Despite the development and introduction of maize production technologies such as improved seed varieties, fertilizers, pesticides, herbicides, planters and irrigational systems by the existing research institutes such as the International Institute of Tropical Agriculture (IITA), National Cereal and Research Institute (NCRI) to increase the maize productivity level in Nigeria, maize average yield is still found to

be very low (1/3 tons/ha) compared to its potential yield with little impact on the welfare of the farm household (Babatunde Fakayode, & Obafemim 2008). It therefore becomes pertinent to assess the Perception on the impact of adopting improved Maize production technology on farmers' household welfare in Yobe State.

### **Statement of the Problem**

Maize is becoming the miracle seed for Nigeria's agricultural and economic development. It has established itself as a very significant component of the farming system and determines the cropping pattern of the predominantly peasant farmers, especially in the Northern Nigeria, Maize production may be one of the means of alleviating poverty among farmers owing to the fact that maize is among the most important staple foods in Nigeria. Maize production may be one of the means of alleviating poverty among farmers. This is owing to the fact that maize is among the most important staple foods in Nigeria. It accounts for about two-third of the calorie intake of the country's population (Jamilu, Abdul-Aziz, Jafaru; Sani & Abudu, 2014). In most parts of Nigeria, the crop has grown to be a crop cultivated for commercial purpose to generate income to improve the welfare of the farming populace. Despite the economic importance of maize to the teeming populace in Nigeria, it has not been produced to meet food and industrial needs of the country. This could be attributed to low productivity from maize farms or that farmers have not adopted improved technologies for maize production. To meet the food and industrial demand for maize, USAID MARKETS II has invested resources in building capacities of small holder farmers to adopt recommended best practices for maize value chain in Kano and Kaduna States, as well as other parts of Nigeria.

In an effort to curb the incidence of poverty as well as food insecurity in the country, successive governments embarked on various policies and programmes aimed at adopting improved Maize production technologies with a view to boosting farmers welfare (Umar, Musa & Kamsang, 2017). It is therefore expedient to critically examine if the adoption of these improved maize production technologies have achieved the desired goal of improvement of the welfare of the adopters.

### **Objectives of the Study**

The broad objective of the study was to determine "Perception on the impact of adopting improved Maize production technology on farmers' household welfare in Yobe State. The specific objectives of the study are:

- i. analyse the awareness level of maize production technologies among farmers in the study area;
- ii. determine factors affecting the adoption of improved maize production technologies,
- iii. to estimate the economic impact of the adoption of improved maize production technologies on net revenue from maize production in the study area and
- iv. examine the constraints to adoption of adoption of improved maize production technologies in the study area

### **Research Questions**

The following research questions are formulated to guide the study;

- i. What are the awareness levels of maize production technologies among farmers in the study area?
- ii. What are the factors affecting the adoption of improved maize production technologies?
- iii. What are the economic impacts of the adoption of improved maize production technologies on farmers' production in the study area?
- iv. What are the constraints to adoption of adoption of improved maize production technologies in the study area?

## **METHODOLOGY**

### **Study Area**

The study was carried out in Yobe state located in the North-Eastern region of Nigeria. The state, covers an area of 45,502 sq. km and is located between latitudes 12; 0'N and 11 A °30'N and longitudes 7; \ °50'E and 8A °22'E and is bounded by Diffa Region and the Zinder Region of Niger Republic to the north. It also has borders with Bauchi, Borno, Gombe and Jigawa States. Yobe State has rich cultural values 'with annual rainfall ranging from 800mm to 1000mm.

### **Research Design**

Survey research design was used for the study. The most common descriptive research method is the survey design (Thomas and Nelson, 2001). The method involves systematic collection of data from the entire population through the use of questionnaire, interview or observation in order to find out the opinions of individuals about something.

### **Population of the Study**

The population of the study was comprises of all Maize farmers in who adopted improved Maize production technologies in the production of Maize in Yobe State for 2022/2023 production year.

### **Sample and Sampling Procedure**

The study was used a multi stage sampling procedure to select the respondents for the study. The multi stage sampling technique was used to select ten (10) Local Government Area based on their massive production of Maize, absence of security threat and proximity to the researchers. In the second stage, five (5) wards were randomly selected from each of the selected Local Government Area. This means that fifty (50) wards from the ten (10) Local Government Areas. Finally, ten (10) Farming Households using improved Maize production technologies were randomly selected from each ward. This therefore, means that five hundred (500) respondents were selected for this study.

### **Method of Data Collection**

Both primary and secondary data was used for the study. The primary data was collected through the use of structured questionnaire to obtained information from the respondents. Secondary data was obtained from published materials like books, journals, reports and magazine, unpublished project and also from the internet. A structured questionnaire was used to collect data from the respondents. The structured questionnaire was consist of both open-ended and closed ended questions. A total 500 questionnaires was administered.

### **Validation of the Instrument**

In order to ensure the validity (appropriateness) of the instrument for data collection, it was subject to face and content validity with the assistance of assistance of experts (lecturers). To also ensure that the data to be obtained are reliable, an analysis of internal consistency of the instrument will be carried out. A total number of 40 copies of the questionnaires and interview schedule will be administer to Maize farmers in Borno State that was not be included in the study. The split – half method of reliability was used and a reliability co – efficient ( $r$  – value) of 0.70 and above is expected which is good enough for the instrument as this indicates a 70 percent reliability.

### **Procedure for Data Collection**

The researchers was administered the questionnaire with the help of four (4) research assistants. The research assistants were trained by the researchers on how to administer and collect the questionnaire back after completion by the respondents. The items of the questionnaire were discussed point by point during the training. Before proceeding for data collection, the cooperation of Village Heads and Wards heads was sought. The question items were explained to the respondents where necessary to remove any possible misinterpretation of the questions.

### **Method of Data Analysis**

The data collected for the study was analyzed using the descriptive statistics of mean and standard deviation. A cut- off point of 2.50 was used to determine the mean.

**RESULTS AND DISCUSSION**

**Research Question 1:** *What is the level of awareness of improved maize production technologies among farmers in the study area?*

**Table 1:** Mean and Standard Deviation on the level of awareness of improved maize production technologies among farmers in the study area

S/N.	Item Statements	$\bar{X}$	SD	Remarks
1	Planting of improved varieties of maize	3.33	0.73	Agreed
2	Selection of disease-free planting materials	3.73	0.61	Agreed
3	Selection of an appropriate site for maize production	2.97	0.97	Agreed
4	Seed viability test before planting	3.14	0.95	Agreed
5	Monoculture for optimum yield	3.17	0.69	Agreed
6	Use of appropriate weed control technologies	3.14	0.95	Agreed
7	Farm monitoring, uprooting and destruction of diseased plants	3.74	0.57	Agreed
8	Using tillage methods especially in erosion prone area	2.88	1.03	Agreed
9	Use recommended spacing and planting distance	3.86	0.47	Agreed
10	Use of integrated pest management	2.95	0.97	Agreed
11	Use of appropriate or suitable irrigation techniques	2.97	0.97	Agreed
12	Use of integrated weed management	2.96	0.66	Agreed
13	Timely harvesting	3.04	0.87	Agreed
14	Use of modern methods of processing and storage	3.73	0.61	Agreed

From table 2 above, the findings of the study revealed that the respondents agreed with the statements that, planting of improved varieties of maize, selection of disease-free planting materials, selection of an appropriate site for maize production, seed viability test before planting, Monoculture for optimum yields, use of appropriate weed control technologies, Farm monitoring, uprooting and destruction of diseased plants, using tillage methods especially in erosion prone area, use recommended spacing and planting distance, use of integrated pest management, use of appropriate or suitable irrigation techniques, use of integrated weed management, timely harvesting and use of modern methods of processing and storage are some of the level of awareness of improved maize production technologies among farmers in the study area

**Research Question 2:** *What are the determinants of the adoption of the improved maize production technologies?*

**Table 2:** Mean and Standard Deviation on the determinants of the adoption of the improved maize production technologies

S/N.	Item Statements	$\bar{X}$	SD	Remarks
1	Education level of farmers	2.96	0.66	Agreed
2	Farmers farm size	3.50	0.75	Agreed
3	Farmers level of income	3.45	0.85	Agreed
4	Farmers access to credit	3.04	0.87	Agreed
5	Labor availability	2.73	0.96	Agreed
6	Membership in farmer organizations	3.20	0.93	Agreed
7	Peer influence and support	2.73	0.96	Agreed
8	Perceived benefits and risks	2.95	0.97	Agreed
9	Compatibility with existing practices	1.62	1.06	Disagreed
10	Cost of technology	3.73	0.61	Agreed
11	Climatic conditions	3.73	0.61	Agreed
12	Cultural beliefs and practices	2.32	0.75	Disagreed
13	Perception of innovation	2.95	1.07	Agreed

From table 2 above, the findings of the study also revealed that the respondents agreed with the statements that, education level of farmers, farmers farm size, farmers level of income, farmers access to credit, labor availability, membership in farmer organizations, peer influence and support, perceived benefits and risks, cost of technology, climatic conditions and perception of innovation are some of the determinants of the adoption of the improved maize production technologies while they disagreed with the statements that compatibility with existing practices and cultural beliefs and practices as not the determinants of the adoption of the improved maize production technologies in the study area.

**Research Question 3:** *What are the economic impacts of the adoption of the improved maize production technologies?*

**Table 3:** Mean and Standard Deviation on the economic impact of the adoption of the improved maize production technologies

S/N.	Item Statements	$\bar{X}$	SD	Remarks
1	Increased maize yields	3.11	0.85	Agreed
2	Improved farmer incomes	3.38	0.85	Agreed
3	Reduction in production costs	3.14	0.95	Agreed
4	Improved marketability	2.10	0.77	Agreed
5	Expansion into new markets	3.87	0.58	Agreed
6	Increased food supply	3.14	0.95	Agreed
7	Price stabilization	3.04	0.87	Agreed
8	Job creation	3.73	0.61	Agreed
9	Economic spillovers	3.38	0.85	Agreed
10	Reduced vulnerability	3.04	0.87	Agreed
11	Stability of production	2.73	0.96	Agreed
12	Improved maize production can enhance the sector's contribution to the national economy, supporting overall economic growth	3.38	0.85	Agreed

From table 3 above, the findings of the study further revealed that the respondents agreed with the statement that, increased maize yields, improved farmer incomes, reduction in production costs, improved marketability, expansion into new markets, increased food supply, price stabilization, job creation, economic spillovers, reduced vulnerability, stability of production and improved maize production can enhance the sector's contribution to the national economy, supporting overall economic growth are some of the economic impact of the adoption of the improved maize production technologies.

**Research Question 4:** *What are the constraints in adopting improved maize production technologies?*

**Table 4:** Mean and Standard Deviation on the constraints in adopting improved maize production technologies

S/N.	Item Statements	$\bar{X}$	SD	Remarks
1	High cost of improved seeds	3.69	0.73	Agreed
2	Adulteration of chemicals	3.34	0.89	Agreed
3	Land tenure problem	2.96	0.95	Agreed
4	Lack of modern processing equipment	3.53	0.81	Agreed
5	Scarcity of improved seeds	2.84	1.15	Agreed
6	Inadequate technical know-how	3.42	0.98	Agreed
7	Inadequate access to inputs	3.38	0.89	Agreed
8	High cost of inputs	3.26	1.07	Agreed
9	Pest and diseases infestation	3.46	0.94	Agreed
10	Inadequate capital	3.23	1.03	Agreed

From table 4 above, the findings of the study also revealed that the respondents agreed with the statements that, high cost of improved seeds, adulteration of chemicals, land tenure problem, lack of modern processing equipment, scarcity of improved seeds, inadequate technical know-how, inadequate

access to inputs, high cost of inputs, Pest and diseases infestation and inadequate capital are some of the constraints in adopting improved maize production technologies in Yobe State.

### **DISCUSSION OF FINDINGS**

The findings of the study revealed that, planting of improved varieties of maize, selection of disease-free planting materials, selection of an appropriate site for maize production, seed viability test before planting, Monoculture for optimum yields, use of appropriate weed control technologies, Farm monitoring, uprooting and destruction of diseased plants, using tillage methods especially in erosion prone area, use recommended spacing and planting distance, use of integrated pest management, use of appropriate or suitable irrigation techniques, use of integrated weed management, timely harvesting and use of modern methods of processing and storage are some of the level of awareness of improved maize production technologies among farmers in Yobe State. Bawa & Ani (2014) report that it was assumed that productivity increases would come from the use of improved technology, especially planting material and fertilizer.

The findings of the study also revealed that, education level of farmers, farmers farm size, farmers level of income, farmers access to credit, labor availability, membership in farmer organizations, peer influence and support, perceived benefits and risks, cost of technology, climatic conditions and perception of innovation are some of the determinants of the adoption of the improved maize production technologies while they disagreed with the statements that compatibility with existing practices and cultural beliefs and practices as not the determinants of the adoption of the improved maize production technologies in Yobe State. The findings of the study is collaborated with the work of Debelo (2015) who reported that, farmers continue to lose in terms of crop yields despite introduction of new agricultural technologies since the cost of fertilizers and improved seeds continue to be high. He further found that farmer's adoption behaviour is influenced by costs of inputs especially maize seed and fertilizers, access to credits, off - farm income, perceived yields and risks.

The findings of the study further revealed that, increased maize yields, improved farmer incomes, reduction in production costs, improved marketability, expansion into new markets, increased food supply, price stabilization, job creation, economic spillovers, reduced vulnerability, stability of production and improved maize production can enhance the sector's contribution to the national economy, supporting overall economic growth are some of the economic impact of the adoption of the improved maize production technologies in Yobe State. The findings of the study is collaborated with the work of Donsop-Nguezet, Diagne, Okoruwa, & Ojehomon (2011) who found out that the impact of Nerica rice adoption on farmers shows that adoption of NERICA varieties has a positive and significant impact on farm household income and welfare measured by the per capita expenditure and poverty reduction in rural Nigeria.

The findings of the study also revealed that, high cost of improved seeds, adulteration of chemicals, land tenure problem, lack of modern processing equipment, scarcity of improved seeds, inadequate technical know-how, inadequate access to inputs, high cost of inputs, Pest and diseases infestation and inadequate capital are some of the constraints in adopting improved maize production technologies in Yobe State. The findings of the study are collaborated with the work of Doss (2006) who found out that the small scale farmers are faced with the constraint of non-availability of improved seeds, lack of easy credit facilities, untimely availability of improved production inputs, high costs of production inputs and lack of technical guidance when required.

### **CONCLUSION**

This study analyzed the Perception on the impact of adopting improved Maize production technology on farmers' household welfare in Yobe State, Nigeria and based on the results obtained from the study, the following conclusions were reached. Result of this study shows that improved maize production technology adoption positively contributes towards the welfare of households in the study area. The factors that influence farmers' adoption decision include age of the household head, labor availability, farm size, asset holding and membership of farm organization, off-farm income, farming experience, and



contact with extension. To improve productivity, food security, and welfare of smallholder farmers, policy priority should be geared toward improving access to credit and fund extension activities, such as training. Furthermore, farmers should be encouraged to join farmers' organizations or cooperatives as these would ease their access to information on agricultural innovations, in addition to access to credit facility. The results of this study offer evidence to the potential impact of agricultural technologies on crop productivity and welfare of households in Nigeria.

## RECOMMENDATIONS

The following recommendations were made that:-

1. Adoption of improved maize varieties can be enhanced through the increased availability of improved maize varieties as some farmers are very much interested in cultivating these varieties but do not have access to the seeds.
2. Adequate seed policy should be put in place to fast track seed multiplication and distribution and on-farm trials through effective extension service delivery so as to promote, intensify and sustain the adoption of improved maize varieties.
3. The government and other Non-Governmental Organization (NGOs) should do their part in creating awareness via radio and phone messages, facilitating the access and mobilizing farmers to adopt the improved varieties so that farmers can improve their agricultural productivity and then change their livelihood.
4. The government should encourage farmer associations which can play an important role in the process of adoption. The farmer associations should also target the farmers' need and should provide them with the necessary information about the associations.

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