

Improved Mixed Farming Method and Food Security in Kenya: A Case of Kenya Cereals Enhanced Program in Mwingi West Sub-County, Kitui County

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Abstract: *Realization of food security entails numerous strategies farming programmes being one of them among others. If these numerous farming strategies are adopted, they can enhance increased food security across the world and particularly in Mwingi West. The study sought to examine improved farming mixed method on food security in Kenya: a Case of Kenya Cereals enhanced programme in Mwingi West Sub-County, Kitui County. Mixed methods research approach focusing on descriptive research design was adopted. The study targeted 79, 255 from which, a sample size of 398 was selected using Yamane formula. Snow-ball sampling technique was used to identify the respondents in the study. Quantitative and qualitative data were collected utilizing questionnaires and interview guides respectively. Quantitative data was analyzed using Statistical Package for Social Sciences version 25 and presented in frequency tables and figures while qualitative data was analyzed through thematic content analysis and presented in narrations. The study revealed that KCEP through its farming methods has been instrumental in improving food security in Mwingi West. The study recommended that farmers should adopt drought and pest/disease-resistant crops and animals. It is also important to increase the ratio of extension officers to farmers through government and other interested agencies. Use of certified seeds and fertilizers so as to increase yields and quality and also reduce the effects of pests and diseases. Government to consider subsidizing farm inputs and facilitating the availability of water for irrigation. The weather forecast systems should also be improved and proper communication be done to the farmers for the proper and timely planting.*

Keywords: *improved farming, farming methods, food security, Kenya Cereals Enhanced Programme, mixed farming*

INTRODUCTION

The social, economic, and political development of any nation is greatly influenced by its quality agriculture. According to Sunkad (2020), when man initially began to settle life on the planet, farming can be considered to be one of the oldest jobs connected to him. Man had to rely on hunting for food before the agricultural occupation was created. As Sunkad (2020), continues his argument, agriculture is now employed to support the nation's national income in addition to supplying food for people and animals. Several countries still rely on agriculture to create jobs and support the national economy in the modern era of science and technology.

According to Peng et al., (2019) while citing FAO (2009); food security is defined as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Four dimensions of food security have been identified in line with different levels. The said levels are availability which revolves around national level, accessibility revolving within household, utilization identified with Individual level, and stability that may be considered as a time dimension that affects all the levels. Humanitarian Global (2021), opines that there is no one single indicator to measure food security but a number of proxy indicators. They can be focused on food security outcomes which range from food consumption, nutrition, expenditure, food frequency, food coping strategy among others. This is to assess the food security status of households. Food consumption diversity which accounts for a number of individual foods consumed over a reference period. Food frequency is about a number of days (in past week) that a specific food item has been consumed. Nutritional importance is about food groups weighed to reflect their nutritional importance.

In diverse places of the world, people didn't start farming for any one reason or set of reasons. For instance, according to Montesclaros and Teng, (2021) in Asian Continent agriculture is considered to take centre stage in mitigating famine as well as undernourishment in the region. However its capacity to guarantee food security outcomes stands complex as a result of hunger persistence despite excess food availability as opposed to consumption on per-capita basis. Emphasis call to be directed to physical and economic access to food, and importantly focusing as the way food availability and access are translated into nutrition outcomes. Referring to farming and food security; Naomi and Cooclanis (2019), argues that it is believed that seasonal shifts brought about by the end of the last ice age in the Near East favoured annual plants like wild grains. Intense pressure on natural food resources in other places such as East Asia may have compelled individuals to come up with their own remedies.

Food security on the growing African continent has sparked widespread concern. For instance, according to the most recent data, 73 million people in Africa experience severe food insecurity (Akiwumi, 2020). Over 85% of the food consumed in Africa between 2016 and 2018 was imported resulting in an annual food expenditure of \$35 billion that is expected to rise to \$110 billion by 2025. For food security, this strong reliance on global markets is risky, especially during periods of protracted crises (Akiwumi, 2020). From 2019, drought and climate change have severely impacted African regions, particularly the Sahel and southern Africa, claims Akiwumi, (2020).

The Horn of Africa's enormous locust outbreak has increased the strain on the local food systems. As of 2020, more than 75% of the population in sub-Saharan was reported to be undernourished. In Africa, 282 million people were experiencing hunger more than twice the proportion of any other region globally. Across East Africa, conditions were seen deteriorating, with millions of people facing hunger and severe food insecurity. As expected, these levels of food insecurity worsened further in 2021, while a decline in diminished purchasing power, lost livelihoods, income opportunities, and limited access to basic food and services are all continued into 2022. The situation was exacerbated by the Russia–Ukraine war and its negative (Onyeaka,

Tamasiga, and Nkoutchou, et al., (2022). This information portrays the severity of food insecurity in Africa owing in mind this is Sub-Saharan.

Kenya as a nation experiences several types of precipitation in its various locations, including the central highlands, the North Rift, the nation's primary agricultural sector, the Nyanza region, and the coastline region, among others. According to the Famine Early Warning Systems Network (2022), the 2021 October to December short rains represented the third season in a row with below-average rainfall, having a considerable detrimental effect on both marginal agricultural and pastoral areas. According to the study's findings from the Kenya Food Security Steering Group's annual Short Rains Assessment, the number of people experiencing food insecurity in pastoral and marginal agricultural areas increased from 2.1 million in August 2021 to 3.1 million in February 2022 as a result of resource-based conflict, poor crop and livestock production, livestock disease and mortality, and effects of successively poor sea conditions. The causes listed that contribute to food insecurity in Kenya are either beyond human control or expensive to address. The researcher believes that new farming system ideas could greatly aid in the situation's mitigation.

Kitui County rate is one of 10 biggest counties in Kenya by geographical standards. It has a total land area of 30,429 km² and a population density of 37 people per km²; taking to account that, national average is 82 people per km². However, with huge agricultural potential, Kitui County poverty levels remains alarming. Poor population in the county account for 48%, which is considered higher than the national rate which is 36%. The poor in Kitui County stand for 3.2% of the poor in Kenya. The households and individuals considered to live under absolute poverty are those whose monthly adult equivalent total consumption expenditure per person is less than Ksh 3,252 in rural and peri-urban areas and less than Ksh 5,995 in core urban areas (KNBS, 2016). Percentage of people living below the poverty line (US\$ 1.90 a day) is 60.4% while people experiencing food poverty is estimated at 39%, compared to the national average of 32%. The monthly adult equivalent food consumption expenditure per person is less than Ksh 1,954 among food-poor households and individuals in rural and peri-urban areas and less than Ksh 2,551 in core-urban areas. Relatedly, there are high rates of nutritional deficit. Stunting occurs in 38.2% of children below five, while wasting occurs in 4.2% of children below five (KNBS, 2016). The presented information clearly depicts that food security is predominant among the residents of the Kitui County of which Mwingi West Sub-County where the study took place, is not exceptional.

Farmers and other farming stakeholders have developed modern/improved farming practices in an effort to increase food security. In contrast to traditional farming, modern agricultural systems need farmers to play more central roles and to be keen to employ technology and information to regulate most system components. Dutonde (2018), believes that contemporary agriculture tends to regard its success as depending on its availability of resources, technology, management, investments, markets, and favourable government policies, as opposed to the seclusion inherent in traditional arrangements. This information, as provided by Dutonde, (2018) lays the groundwork not only for the Mwingi West Sub-County but also generally for any large

productive agriculture in the communities. However, achieving this goal will be very difficult due to the affordability issue.

One of the ways of tackling food insecurity in Kenya and in Kitui County in particular, is the introduction of farming programs one of them being Kenya Cereals Enhancement Programme (KCEP). KCEP currently known as Kenya Cereals Enhancement Programme-Climate Resilience Agricultural Livelihoods (KCEP-CRAL) in the Arid and Semi-Arid Lands (ASALs) of Kenya has an overarching development goal to help smallholders in the (ASALs) regions reduce rural poverty and food insecurity by maximizing their economic potential, while also enhancing their resilience to climate change and ability to manage their natural resources. According to Esilaba et al., (2021), the National Government of Kenya has been working with the County Government of Kitui since August 2016 to improve the county's food security condition through KCEP-CRAL. Under a loan and grant from the Adaptation of Smallholder Agricultural Plan, the Kenyan government, European Union, and IFAD have partnered on this program.

Similarly to the other Counties gaining from the same program, the program's implementers are assisting smallholder farmers in Kitui County to transition from subsistence to commercially-oriented, climate-resilient agricultural practices by enhancing productivity, postproduction management techniques, and market ties for specific value chains; secondly, it is empowering women of County Government and communities to sustainably and consensually manage their land.

Kitui County has been constantly referred as food stressed County as Katuto, Mueke&Kisimbii, (2020) puts it citing (Kenya Demographic Health Survey, 2015). This has consequential posed high rates of chronic malnutrition of 46% against a national average of 26% among children aged. This has been highly attributed to the County's arid climate. Despite all said and done, Kitui County Government (2017), asserts that; the topography of Kitui County is suitable for irrigation; its irrigation potential is estimated to be 11,095 ha, of which only 1,850 ha have been utilized. Irrigation is practiced along major rivers such as Mui, Thua, Kithyoko, Tana, Athi, Nzeeu, Thunguthu, Katse, Kauwi, and Kalundu. It is coupled with ongoing county projects for water harvesting, including kitchen gardening, on-farm ponds, and cluster irrigation schemes (Kitui County Government, 2017).

According to Gioto and Mativo, (2017) who compiled a report for the Kenya Food Security Steering Group and the County Steering Group in Kitui County in February 2017; Mwingi West Sub-County is the third-most-affected Sub-County in the county. The blame was on high costs, persistent drought, failed crops, and inadequate irrigation in Kyome and Tana, both of which were caused by the river's low water levels. The report also emphasized the percentages of the Kyome/Thaana; 25-30%; Kiomo/Kyethani; 20-30%, Nguutani; 20-30%, and Migwani; 15-20% populations are in need of humanitarian aid. Kenya News Agency, (2021) reported that "scores of pupils at Kalimamundu Primary School in Kyuso Sub-County in Kitui lost consciousness while in class due to food cravings, this led to a public outcry imploring for the donation of ingredient to the school by well-wishers," illustrating the hopelessness of the food situation in the county.

To mitigate such dehumanizing instances as the one cited, and evident that they are castigated by the food insecurity, Kitui County Government has invested a lot in different approaches whereby programmes geared to food security promotion have for the past recent decades taken an upper hand for the same. Though these initiatives have been put in place, the problem is still rampant in Kitui County, and more also on Mwingi West Sub-County residents' neck as evidenced in the increased daily media reports of persons in need of food. KCEP is one of the latest entrants in the said initiatives, and to some extent introducing her operations within Mwingi West in 2019. Her operations are guided by the overarching development goals that are to support farmers in increasing the productivity and profitability of important cereal commodities namely; maize, sorghum, and millet as well as related pulses in order to contribute to national food security and smallholder income production (Esilaba, et al., 2021). It is under the emulated circumstances that this study sought to examine "Improved Farming Mixed Method and Food Security in Kenya: a Case of Kenya Cereals enhanced Programme in Mwingi West Sub-County, Kitui County.

METHODOLOGY

Research Design

A research design, also known as research strategies, is outlined by McCombes (2019), as a plan to respond to a query or series of questions. To be more explicit, the research design describes the means through which the researcher will probe the study's foci. Yet according to (Mwanyota, n.d.), a research design is both the study's strategy and its implementation plan. Methods, measurements, and analyses of data are all laid forth in detail. Descriptive research approaches were emphasized in this mixed-methods study. The researcher gathered rich primary data through the use of questionnaires. The researcher found it relatively cheaper for the respondents were interacted with in their natural setting and they were willing to offer first-hand information.

Sample Size and Sampling Techniques

Those who will take part in the study constitute the sample (McCombes, 2019). According to Tuovila (2019), a statistical technique called "sampling" involves selecting a random subset of a population to analyze. In this study, a representative sample of farmers was selected using a technique known as snowball sampling, which is a form of non-probability sampling. According to Parker et al., (2019), snowball sampling involves starting with a limited number of initial contacts (or "seeds") that meet the research criteria and are encouraged to become participants. Participants who are willing to take part in the study are then invited to make recommendations for other individuals they know who do meet the study's inclusion and participation criteria and who might also be interested in taking part in the study. After a predetermined sample size or a saturation point is achieved, sampling stops. There were also eight agricultural extension officers and four ward administrators, as well as two respondents from each of the four farming groups in the area. For this purpose, the researcher first sought out extension service officers in each ward of Mwingi West Sub-County; then interviewed these informant persons and afterwards the said officials pointed researcher in the direction of farmers using mixed improved

farming techniques, who in turn pointed researcher in the direction of other farmers in their wards using these techniques. The Yamane, (1967) formula was used to determine the sample size.

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

Where; n = required responses/sample population

e² = error margin

N = sample size

N= 79 255

e² = 0.05

Sample for farmers

$$n = \frac{79\,255}{1+79\,255(0.05)^2}$$

$$n = \frac{79\,255}{1+79\,255(0.0025)}$$

$$n = \frac{79\,255}{1+198.1375}$$

$$n = 397.99 \quad n = 398$$

Table 1

Sample Matrix

Category	Pseudonyms	Target population	Sample Size	Sampling Technique	Data Collection
Farmers		79 255	398	Snowball	Questionnaires
Farming Grps	rep. KIP 1	8	8	Purposive	Interview
Extension officers	KIP 2	8	8	Purposive	Interview
Ward Adms	KIP 3	4	4	Purposive	Interview
KCEP Managers	KIP 4	4	4	Purposive	Interview
Total		79, 279	422		

Data Collection Methods

Data collection is the process of collecting, measuring, and analyzing reliable data from a number of relevant sources (Simplilearn, 2022). Information is gathered by many means, such as a paper questionnaire or a computer-assisted interviewing system, which are collectively referred to as "data gathering tools" (Islam, 2022). Data from farmers was gathered using both open-ended and closed-ended questionnaires to acquire quantitative data. These tools were preferred to gather information from this category of respondents because of the large sample size involved. KCEP managers, ward administration, extension staff, and farming group members were interviewed using interview guides to collect qualitative data.

Data Analysis

The goal of data analysis is to provide decision-makers with actionable insights by collecting, and analyzing data (Calzon, 2022). According to Kelly, (2022) the goal of data analysis is to assist organizations make better decisions through the process of cleansing, modifying, and processing raw data. The quantitative data from the farmers was cleaned, processed, and analyzed using SPSS version 25. Descriptions, tables, numbers, frequencies, and percentages all made up the visual representations of the data analysis. The qualitative data from the key informant persons was also analyzed using theme content analysis and presented in narrative form.

RESULTS

Demographic Characteristics of the Respondents

The respondents' reports showed that female were the majority accounting for 67.8% while male stood at 32.2%.

In terms of marital status, married was the most common status (81.1%), followed by singleness (13.3%), then widowhood (4.4%), and finally divorce (1.1%).

Concerning the age of the respondents, 51 and above years (36.67%) carried the day, ages 31-40 which was 25.56% followed, on the same order ages 21-30 which accounted for 23.33%, came third, and ages 41-50 representing 14.44% years came last. The implication is that majority of the farmers were either experienced in the exercise or have retired from other kind of jobs. It can also be observed that young generation have not engaged themselves in farming affairs yet the endeavor can be source of employment.

Education of the respondents; Primary 38.9% and Secondary 33.3% respectively. Diploma and degree account for 22.2%. Those who did not have formal education 3.6%. Other forms of education 2.0%. From these findings it can be deduced that majority of the farmers have basic education which can help them to do better farming.

Responding on the years spent on farming; the group under 10 years led 33.3%, followed by those in the brackets of 11 to 20 years 27.8%, then those in confines of 21 to 30 years scored 16.7%, and finally those who have been farming for 31 and up years 22.2%. It may be inferred that majority of respondents in this study engaged in farming while KCEP was in power, this suggests that KCEP's inception may have sped up farming's adoption in the realm of science.

Improved Mixed Farming Method through KCEP and Food Security

The study sought to examine improved mixed farming methods through KCEP and food security. The aspects covered under this section included the following: benefits accrued by enrolling to KCEP, improved mixed farming methods practiced by farmers, challenges affecting improved mixed method farming and recommending improving mixed-method farming through KCEP

Benefits Accrued by Enrolling to KCEP

The study sought to examine benefits accrued by enrolling to KCEP. Table 2 shows the distribution of the respondents by Benefits of KCEP to those enrolled

Table 2

Benefits of KCEP to those enrolled

	Frequency	Valid Percent	Cumulative Percent
Improved yields	180	50.0	50.0
Quality produce	130	36.1	86.1
Value per cost of Production	50	13.9	100.0
Total	360	100.0	

Those who enrolled with KCEP gave benefits acquired as a result of the same as presented in table 1. 50.0% indicated that they have improved yields, 36.1% said that the quality of produce has been registered, and the remaining 13.9% answered that they have been able to realize value per the cost of production.

The key informant 1 gave the following narrations:

The KCEP has helped the farmers to adopt good agricultural practices, conservations agriculture principles to enhance production in three pillars including crop rotation, crop cover and minimal tillage. Enterprise selections, biotic factors, climate conditions, said adaptations, availability to access inputs, and farmers' preference for food crops (KII 1, 2023).

In addition, KII 2 had the following to say,

Effectiveness of KCEP in the region, KCEP has been playing a very big role in addressing food security. This is because the program has been supporting farmers by giving farm inputs for instance; seeds and fertilizers. In other instances; the program pays some percentage to help the farmers to acquire farm input for example for the farmers to acquires farm inputs, they pay 10% and KCEP pay 90% of the total of input cost. The program has been so effective in promoting food security by ensuring

that farmers plant early, provide them with metrological guide, and advise them on the varieties of crops to plant based on the weather forecast (KII 2, 2023).

Improved Mixed Farming Methods Practiced

The study sought to examine improved mixed farming methods practiced by farmers. Table 3 shows the distribution of the respondents by mixed farming methods practiced

Table 3

Mixed Farming Methods Practiced

	Frequency	Valid Percent	Cumulative Percent
Agribusiness	80	22.2	22.2
Organic Farming	250	69.4	91.7
Intensive farming	30	8.3	100.0
Total	360	100.0	

Source; (Field survey, 2022).

Table 3 displays the responses about the most common improved farming methods practiced in Mwingi West Sub-County. Organic farming has the majority of the respondents with 69.4%, agribusiness follows with 22.2%, and intensive farming has the least respondents with 8.3%. These responses are affirming that the majority of the respondents are carrying out organic with aim of maintaining soil texture coupled with minimizing chemical application in crop production.

Some of the Challenges Affecting Improved Mixed Method Farming

The study sought to examine some of the challenges affecting improved mixed method farming. Table 4 shows the distribution of the respondents by challenges affecting improved mixed method farming

Table 4

Challenges affecting Improved Mixed methods Farming

	Frequency	Valid Percent	Cumulative Percent
Unpredictable weather patterns	100	27.8	27.8
labour intensity in farming operations	60	16.7	44.4
High cost of farm inputs	80	22.2	66.7
Inadequate markets for farm produce	20	5.6	72.2
Pests and Diseases	40	11.1	83.3
Inadequate lands for farming	60	16.7	100.0
Total	360	100.0	

Table 4 displays the respondents' reactions to the question. Unpredictable weather patterns led with 27.8%, high cost of farm inputs seconded with 22.2%, labor intensity in farming operations and inadequate lands for farming followed suit tying with 16.7%, pests and diseases registered 11.1%, and inadequate markets for farm produce was the least with 5.6%.

Recommending Improving Mixed-Method Farming through KCEP

The study sought to examine recommending improving mixed-method farming through KCEP. Table 5 shows the distribution of the respondents by recommending improving mixed-method farming through KCEP.

Table 5

The recommendations for improving mixed-method farming through KCEP

	Frequency	Valid Percent	Cumulative Percent
Increase the ratio of extension officers to the number of farmers.	72	20.0	20.0
Adopt drought-resistant crops and animals.	90	25.0	45.0
Farmers be facilitated with machinery for irrigation.	60	16.7	61.7
Use of certified seeds and fertilizers.	78	21.7	83.3
Observe weather patterns for timely planting.	60	16.7	100.0
Total	360	100.0	

Table 5 shows some of the proposed remedies. Encouraging farmers to adopt drought-resistant crops and animals took 25%, increasing the ratio of extension officers to the number of farmers accounted for 20%, use of certified seeds and fertilizers had 21.7%, facilitating farmers with machinery for irrigation and observing weather patterns for timely planting fell to 16.7%.

The key informants' findings were as revealed;

The farmers have to do this: - seed selection, plant population – spacing gapping liming, timely weeding, soil fertility management, soil testing for fertilizers applications, pests and disease control, harvesting – maturing indices that is to avoid loss in farmers. If rain fails and do this in irrigation; there could be food security (KII 6, 2023).

In the same line, KII 12 had the following to say

There have been several trainings like field days, chairs days where we go to the market, receive farmer's challenges, and advise them on an appropriate measures, training on field security advice and use of certified seeds adoption of Conservation Agriculture to conserve moisture, training farmers on soil conservation measures like laying Terraces and retention ditches (KII 12, 2023).

In coherent with the same idea, KII 5 observed the following

There have been trainings and through County Government support, we have been visiting farmers to give them some guidelines about climate change and seed varieties which they are supposed to grow in line with weather forecast (KII 5, 2023).

Another KII had the following to add:

Through advices from agricultural extension officers, farmers can improve on production and also following the methods: - through good agricultural practices, Weather forecast, Weed control, Pest and disease control, scouting to identity the pests, use of certified seeds, sub-soilers, rippers, chisel, early planting and Water harvesting(KII 10, 2023).

DISCUSSION

The study examined improved mixed farming methods and their impact on food security through the Kilifi County Empowerment Program (KCEP). The findings shed light on the benefits of modern farming practices, including organic farming and agribusiness, and their role in addressing food security challenges in Mwingi West Sub-County, Kenya. The study's findings align with arguments made by Sourajit et al., (2021), who emphasize the importance of sustainable farming practices, such as organic farming. Organic farming prioritizes environmental harmony and soil and human health by relying on biodiversity and natural processes instead of chemical inputs. This perspective resonates with the majority of respondents in Mwingi West Sub-County, who are engaged in organic farming, reflecting a growing awareness of sustainable agricultural practices.

Furthermore, the study identifies agribusiness as a burgeoning trend, which is in line with the idea that agribusiness can alleviate unemployment and boost incomes, as suggested in the literature. Agribusiness offers opportunities for farmers to engage in commercial and market-oriented agricultural activities, potentially increasing their financial stability.

The study also observes that intensive farming practices are less common due to high economic input demands and the need for specialized knowledge and skills. This aligns with Abdul et al.'s (2017) perspective on modern farming, which involves practices like disease-resistant hybrids, reduced pesticide use, and biological pest control. These methods often require substantial investments and specialized knowledge, potentially explaining the lower adoption of intensive farming methods among the study's respondents. Based on the overlying challenges, the study underscores the role of technology and information in enhancing mixed farming methods, consistent with Dutonde's (2018) assertion. Contemporary farmers view themselves as central players in managing various aspects of the agricultural system. This highlights the interconnectedness of factors such as access to resources, technology, governance, investment, markets, and government policies in determining the success of modern agriculture.

Additionally, the study contributes to the understanding of mixed farming, as described by Ramnath et al., (2020). Mixed farming involves practicing different farming types on the same land, enabling year-round land and labor utilization, income diversification, and expanded cropping opportunities. This approach is crucial for food security and economic stability in rural areas. The study underscores the significance of farming programs like KCEP in addressing food security challenges in contemporary Kenya. In a world where food security is integral to holistic development, such programs play a pivotal role in ensuring sustainable development, aligning with the Sustainable Development Goals (SDGs).

The study's findings align with existing literature on modern farming practices, sustainable agriculture, and the role of agricultural programs in addressing food security challenges. These insights contribute to a comprehensive understanding of the agricultural landscape and highlight the importance of sustainable and modern farming practices in ensuring food security and sustainable development. As global challenges like food security continue to evolve, adopting these practices becomes increasingly crucial for the well-being of communities and the planet.

CONCLUSION

The findings indicated that KCEP through her affairs in Mwingi West Sub-County has positively impacted farming activities in the area especially in terms of improved yields and promoting organic farming as well as the least modern practiced farming systems, for instance, agribusiness and intensive farming. According to the findings, organic farming not only improves food security but also ensures the protection of the environment. This study prepares ground for the realization of SDG 2, 3, 12, and to some extent 15 which is connected with taking care of environment.

Recommendation towards addressing the challenges associated with KCEP's bid to ensure food security in Mwingi West and beyond in line of intensive farming, agribusiness, and organic farming, farmers are urged to adopt drought and pest/disease-resistant crops and animals. It is also important to increase the ratio of extension officers to farmers through government and other interested agencies. Use of certified seeds and fertilizers so as to increase yields and quality and also reduce the effects of pests and diseases. Government to consider subsidizing farm inputs and facilitating the availability of water for irrigation. The weather forecast systems should also be improved and proper communication be done to the farmers for the proper and timely planting.

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