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Effectiveness of E-Wallet Scheme on the Accessibility of Farm Inputs by Farmers in Kaduna State, Nigeria

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ABSTRACT
This study assessed the Effectiveness of E-Wallet Scheme on the Accessibility of Farm Inputs by Farmers in Kaduna State, Nigeria. The specific objectives were to: identify the reasons for farmers' participation in the scheme, determine effectiveness of E-wallet, determine the average annual income of the farmers before and after E-Wallet scheme, and identify the factors that influenced the Effectiveness of E-wallet scheme. Data were collected by the use of structured interview schedule with the help of trained enumerators from Kaduna State Agricultural Development Project (KADP). The research used 240 questionnaires which were administered to the beneficiaries in the four Zones of KADP that constitute the study area. Descriptive statistics, Likert scale and Logit regression model were used to analyze the data collected. The study adjudged that e-wallet scheme was very effective in timely supply of inputs, quality supply of inputs and access to inputs. On the effect of the scheme on their livelihood, 34.6%, 30% and 28.7% of the respondents reported that it was effective on their businesses, productivity, and income, respectively. Income, Network, Access to fertilizer, Access to improved seed, redemption centers were factors that were positive and significant in influencing the effectiveness of the E-wallet Scheme in the study area. The study revealed that 51.7% said that a payment above the stipulated price was one of the major challenges faced by farmers of the scheme. It is recommended that the quality of fertilizer and seeds supplied should be scrutinized to avoid fake supplies and there should be strict monitoring to curb increase in prices and sale of the inputs by beneficiaries.

Keywords: Effectiveness, E-wallet, Influence and Accessibility

INTRODUCTION

The backbone of any agricultural revolution is considered to be the access of farmers to modern agricultural inputs. For agriculture to prosper, farm inputs need to be available, affordable, accessible, and good quality. Seeds, fertilizers, and agro-chemicals, are essential for improving the productivity and incomes of smallholder farmers in developing countries. As input supply is a critical factor in inclusive agricultural and rural development, many donors support initiatives that improve smallholders' access to inputs while some of these programs are successful; others are not (Belt *et al*., 2015). These agricultural inputs range from improved seeds, fertilizers and crop protection chemicals to farm machinery, irrigation and knowledge. Seeds are critical to successful crop production and inevitably, farm productivity and profitability (Venkatesh and Nithyashree, 2014).Seed is the basic input in agriculture and its potential determines the productivity of other inputs. Therefore, it assumes primary importance in agricultural inputs. Fertilizer supplies nutrients to the soil that are essential for growth. Increased use of fertilizer and improved seeds are partially credited with large increases in agricultural productivity growth in Asia during the Green Revolution in the 1960s (Sahel, 2014).

Most agricultural output comes from resource-poor small farmers (with holdings between 0.8 and 1.2 ha of land) (IFDC/IFPRI, 2012). These resource poor farmers are characterized by using low levels of inputs and consequently also generating low output. Many of them are still using obsolete farming techniques and do not have access to basic production tools or production inputs (improved seed varieties, fertilizer and herbicides.) typically relegated to marginal lands. Since the country's independence, the agricultural sector has experienced mixed results, from growth in the production of some crops to a decline in others, with an overall decline in

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agriculture production. One of the most difficult challenges for smallholder farmers is a reliable source of high quality agricultural inputs, such as seed, fertilizer, farm equipment, veterinary supplies and services, and sustainable extension services. Access to these farm services results in higher quality and quantity production, which in turn yields higher profits and promotes increased on-farm investment. Local retail access to inputs and services is the first step in this intervention (IFDC/IFPRI, 2012; CNFA, 2015). The overall limited growth in production is the result of expanding the cropping area (extensive agriculture) rather than from intensification, since Nigeria has not fully embraced technological advances (high input-high output technologies). This includes the simultaneous use of complementary inputs like fertilizer, improved seeds and crop protection products as a means to increase productivity and yield

Therefore, to promote agricultural development among the millions of Nigerian farmers, the supply and use of fertilizer and other important inputs must be increased. This implies a cost-effective input supply system from importation or production to farm gate. Lack of fertilizer means low yield which means low income, which in turn further keeps fertilizer economically out of reach of local farmers (IFDC/IFPRI, 2012; Danlami, 2014).According to World Bank Report (2013), most agricultural production in Nigeria is mainly carried out by farmers in rural areas. These farms are usually fragmented with the consequence of having low input and low output. The usages of farm machines, fertilizer and improved seeds have been very low.

To overcome the problem associated with inputs supply to farmers especially small scale farmers the Federal Government introduced the Growth Enhancement Support Scheme (GESS) and the use of Electronic Wallet (E-Wallet) approach or simply E-Wallet scheme. The e-wallet scheme is an approach that is designed for small scale farmers to access farm inputs through the use of vouchers. An E-Wallet which is designed for smallholder farmer is defined as an efficient and transparent electronic device system that makes use of vouchers for the purchase and distribution of agricultural inputs (Ezeh, 2013; Adesina, 2013). The criteria for farmers' participation include: farmers being above 18 years old; have participated in a survey authorized by the government to capture farmers' personal detailed information; must own a cell phone with a Registered SIM card and have at least sixty naira credit in the cell phone. The fulfillment of these conditions guarantees the issuance of an E-Wallet voucher to the farmer. The voucher is used to redeem fertilizers, seeds and herbicides from agro- dealers at half the cost price (Signal Alliance, 2014).

Also, for an agro input dealer to participate in the programme, he/she must own a cell phone with a registered SIM card, understand the process of using E-Wallets, and attend training programmes designed for the project. The agro dealers are required to: conduct honest business and guard against fraud; choose and prepare a location for the business transaction; provide storage facilities and be available at the appropriate time to attend to farmer's needs. Other prominent personalities in the scheme are the helpline personnel and redemption supervisors. Each state Agricultural Development Project (ADP) supplied the helpline staffs, and about 3-5 helpline staffs are assigned to each of the Local Government Area. The helpline staff and supervisors connect to the farmers on a daily basis to attend to their needs. The redemption supervisor helps in verifying farmer's identity as well as a farmer's code in the text message received by the farmer, and then compares it with the name and code listed in the farmers' register which the supervisor received from the cell phone. The subsidized farm inputs are delivered directly to farmers through their mobile phones. The project is expected to provide direct linkage between the farmers and the government. This will enable the government to disseminate valuable information to the farmers, thus ensuring farmers' progress (Ezeh, 2013).

Problem Statement

Increasing adoption of modern inputs remains one of the best hopes toward higher agricultural production in developing countries. Agricultural productivity increases and modern input use are high on the international agenda. There is a felt need to increase agricultural production. Some argue that the planet is running out of food because of under-investments in the agricultural sector. This has been especially the case in Africa where there is still a large, perceived potential for productivity growth. The conventional wisdom is that the most promising way to increase agricultural production in Africa is through widespread adoption of modern inputs, i.e. chemical fertilizer and improved seed, as the adoption of these new technologies by African farmers is still much lower than adoption by farmers elsewhere in the world (Mintern *et al*., 2014).

Nigeria has made several attempts over the years to boost farmers' productivity. Among these efforts are the supplies of farm inputs such as improved seeds, agrochemicals and fertilizers at subsidized prices to the farmers. The efficient use of quality agro-inputs (improved seeds, fertilizers and crop protection products, or CPPs) is necessary to improve agricultural production and increase incomes, particularly in Sub-Saharan Africa (SSA), which has necessitated the constant call to increase the much-needed access to agro-inputs, information and modern farming techniques for millions of smallholder farmers. However, a large proportion of these inputs could

not be reached to farmers, as a result of the high level of corruption, insincerity and political interruption in channels. Adesina (2013) pointed out that the old system used in supplying inputs to the farmers was weak, inefficient and fraudulent, hence a large proportion of the farmers could not benefit from it, further stressing that the inputs meant for the farmers were diverted by political elites to other countries for personal gains, noting that most of the fertilizers supplied were adulterated, thus damaging the environment.

The Study Objectives

The major aim of this study was to assess the effectiveness of the E-Wallet Scheme on the accessibility of farm inputs by farmers in Kaduna State. The specific objectives were to: Identify the reasons for farmers' participation in the scheme; determine the effectiveness of the E-Wallet scheme; determine the average annual income of the farmers before E-Wallet Scheme; determine the average annual income of farmers after E-Wallet scheme and identify the factors that influenced the Effectiveness of E-wallet scheme

METHODOLOGY

The Study Area

Kaduna State is one of the 36 States in the Federal Republic of Nigeria. The total land mass of the State is estimated at 46,053 sq km which is about 5% of the total land area of Nigeria. (Kaduna State Government, 2013). It had a projected population of 7,805,131 as of 2014 at a growth rate of 3.2% from a population of 6,113,503 (NPC, 2006). Using 3.18% growth rate as allowed by the National Population Commission, the projected population of Kaduna State would therefore be 8,446,417 by the year 2018. It is situated between latitudes 90^0 2' and 110^0 35' N and between longitude 70^0 15' and 90^0 6' E. (Kaduna State Government, 2013). It is bordered by the Federal Capital Territory and Nasarawa State in the South, South East by Plateau and Bauchi States, North East by Kano State, in the North by Katsina State, North West by Zamfara State and South West by Niger State, Kaduna State is located in a pen plain consisting of various kinds of rocks, such as the older granite, schist and quartzite in variable composition. The vegetation cover is Sudan Savannah type, characterized scattered short trees, shrubs and grasses. Soil type is mostly sandy type though substantial amount of clay is found also. The land gradually slops down toward the west and south west and is drained by two major rivers; Rivers Kaduna and Gurara.

Major Rivers in Kaduna State include the Kaduna, Kogum, Gurara, Matsirga and Galma River. The rainy season starts from April to October with August and September as the wettest months having an annual average temperature of 23^0C-28^0C. The average annual rainfall and humidity are 1,272.5 mm and 56.64%; respectively while the average daily minimum and maximum temperatures are 15.1 and 35.18 degrees Celsius. Kaduna State experiences a tropical continental climate with two distinct seasonal climates, dry and rainy seasons. The wet season (May to October) is very much heavier in the Southern part of the State in places like Kafanchan and Kagoro, which have an average of over 1,524 mm, than in the Northern part like Makarfi and Ikara, which have an average of 1,016mm (Kaduna State
Development Plan, 2014-2018).

Agriculture is the main stay of the economy of Kaduna state with the majority of the people actively engaged in farming. Cash and food crops are cultivated and the produce includes: yam, cotton, groundnut, tobacco, maize, beans, guinea corn, millet, ginger, rice and cassava. A significant number of families are involved in livestock production. The important livestock reared include poultry, cattle, sheep, goats and pigs. Small scale famers dominate agricultural production in the State.Kaduna State is a multi-cultural and multi-ethnic state populated by over 60 different ethnic groups with Hausa/Fulani, Gbagyi and Adara as dominant ethnic groups. (Nigeria Galleria, 2017).

Sampling Procedure and Sample Size

Multi stage sampling technique was used in selecting the respondents for the study. The state is divided into four agricultural zones namely: Birnin-Gwari, Maigana, Lere and Samaru. The first stage involved a random selection of two Local Government Areas (LGA) in each of the four KADP Zones to give eight (8) Local Government Areas. The second stage involved the selection of two redemption centres in each selected LGA in each Zone to give 16 redemption centres. The last stage involved a proportionate random selection of farmers who benefitted from the E-Wallet scheme from each redemption centre at 10% which gives a total of 240 respondents. A structured interview schedule was used in eliciting information from them.

Table 1: Sample frame and sample size of the respondents in the Study Area

Agricultural zone	Local Government Area	Community/Ward	Sample frame	Sample size (10%)
BirninGwari	Chikun	Kujama	200	20
		MararabanRido	120	12
	Kajuru	Kajuru	80	8
		Kufana	40	4
Lere	Lere	Saminaka	280	28
		Lere	200	20
	Kauru	Damakasuwa	300	30
		Pari	120	12
Maigana	Soba	Soba	300	30
		Turawa	80	8
	Kubau	Pambeguwa	200	20
		Zuntu	120	12
Samaru	Kachia	Kachia Urban	200	20
		Gumel	130	13
	Kagarko	Jere North	80	8
		Jere South	50	5
Total			2400	240

Source: Field survey (2016)

Data Collection

Data was collected through the use of structured interview schedule with the help of trained enumerators. The primary data collected was used to determine the effectiveness of the E-Wallet scheme on farmers' accessibility of farm inputs by eliciting information on the following:

Analytical Tools

For this study both descriptive and inferential statistical tools were used to analyse the data. Descriptive statistics such as percentages, mean, tables, frequency and charts were used to achieve objectives 1, 3 and 4(identify the reasons for farmers' participation in the scheme, determine the average annual income of the farmers before e-wallet scheme, determine the average annual income of respondents after e-wallet scheme). Objective 2 (determine the effectiveness of the e-wallet scheme) was measured on a 5-point Likert Scale. While objective 5 (identify the factors that influenced the Effectiveness of E-wallet scheme) was measured using Ordered Logit regression. The effectiveness was based on 5 points likert scale of: very effective (5), effective (4), undecided (3), less effective (2) and not effective (1) which will be added together to get the sum of (15) and then be divided by the total number to get a midpoint of 3.0, therefore any point less than 3.0 will be regarded as not effective while anypoint higher than 3 is effective.

RESULTS AND DISCUSSION

Reasons for farmers' participation in the scheme

Table 2 revealed the motive of involvement in e-wallet scheme among the farmers in the study area. The level of involvement is a logical reason behind the farmers participation in e-wallet scheme. This varies with individuals but it is mostly based on their needs and aspirations. The result in Table 2 revealed that 85.0% of the farmers indicated that subsidized price was the main reason why they engaged in e-wallet scheme. The findings showed that the motive behind the majority of farmers' participation in the scheme was based on reduction in price of inputs which are normally sold at exorbitant price to farmers outside the scheme. Also, 65.8% of the farmers in the study area indicated that they got involved because of good quality of inputs from e-wallet scheme unlike bad ones that are available in the market. Kareem and Akinbile (2015) also reported that increase in income, land size and increase in rice production, easy access to improved rice seeds were some of the reasons the farmers were involved in E-wallet scheme of the Agricultural Transformation Agenda (ATA). More so, 22.9% of the farmers

in the study area revealed that it was easy access to input that made them get involved in e-wallet scheme. The findings revealed that subsidized prices of inputs and good quality of inputs supplied through e-wallet were the major motives behind their involvement.

Table 2: Distribution of farmers according to what influenced their participation in the scheme

Variables	Frequency	Percentages
Subsidized price	204	85.0
Good quality of inputs	158	65.8
No middlemen involvement	20	8.3
Direct to farmers	33	13.8
Not politicized	19	7.9
Product quality	15	6.2
Easy access	55	22.9

Sources: Field survey (2016)
*Multiple responses recorded

Effectiveness of e-wallet

Table 3 revealed the effectiveness of e-wallet scheme in accessing farm inputs. The effectiveness was ranked according to their mean score. Quantity of inputs supplied through the scheme was ranked first with mean value of ($\bar{X}$ = 4.17). The quantity of inputs supplied through the scheme was awesome to most farmers because compared to those in the open market the inputs were cheaper and this was why they got involved in the programme.This was followed by access to inputs through the scheme with the mean of($\bar{X}$ = 4.0). Access to inputs through the scheme as at and when due was also the reason behind many other respondents' participation in the scheme. Inputs accessed through the scheme are fertilizer (NPK and UREA) and seeds such as maize and rice. Also, timely supply of inputs was ranked third with mean value of ($\bar{X}$ = 3.1), the timely and speedy delivery inputs to the beneficiary thrilled the respondents and increase the level of participation in the scheme. The finding was in agreement with Umar *et al* (2015) who reported that farmers' derived satisfaction with access to fertilizer and price of the commodity. Similarly, the findings was in conformity with those of Nwaobiala and Ubor (2016) that stated that the E-Wallet was effective in the provision of inputs, timeliness in the provision of these items. The quality of input supplied through the scheme was least ranked with the mean of ($\bar{X}$ = 2.97). This finding contradicted the findings of Nwalieji *et al* (2015) who reported that quality of inputs supplied to the farmers under GESS in Anambra State was effective.

Table 3: Distribution of farmers according to effectiveness of e-wallet scheme

Variables	Very effective	Effective	Undecided	Less effective	Not effective	Sum	Mean	Remarks
Access to inputs	78 (32.5%)	123 (51.2%)	4 (1.7%)	31 (12.9%)	4 (1.7%)	960	4.0	Effective
Timely supply of input	40 (8.3%)	104 (43.3%)	4 (1.7%)	112 (46.6%)	-	752	3.1	Effective
Quality supplied	23 (9.6%)	71 (29.6%)	24 (10.0%)	119 (49.6)	3 (1.2%)	712	2.97	Not effective
Quantity supplied	101 (42.1%)	103 (42.9%)	12 (5.0%)	24 (10.0%)	-	1001	4.17	Effective

Sources, Field survey, 2016

Average annual income of the farmers before e-wallet scheme

Table 4 showed that 36.7% of the farmers in the study area had annual income of>₦350,000 before E-Wallet scheme while 22.2% of the farmers in the study area had between 101,000-200,000 before participating in e-wallet scheme. Also, 18.0% of the farmers in the study area had between ₦201,000- ₦350,000 before the start of e-wallet scheme while 8.3% of the farmers in the study area had between ₦51,000- ₦100,000 annual incomes before the start of E-Wallet scheme. The mean annual income of the farmers before E-Wallet scheme was₦363, 083.0, this implies that the farmers in the study area were low income earners and this is expected to affect their

participation in e-wallet scheme. The finding is agreement with the reported of Kareem and Akinbile (2015) in which the beneficiaries stated that they had low income before the commencement of the E-Wallet.

Table 4a: Distribution of farmers according to average annual income before E-Wallet

Variables	Frequency	Percentages	Mean
≤50,000	38	15.8	
51000-100,000	20	8.3	
101,000-150,000	25	10.4	
151,000-200,000	26	10.8	
201,000-250,000	25	10.4	
251,000-300,000	9	3.8	
301,000-350,000	9	36.7	
>350,000	88	36.7	363,083.00
Total	240	100.0	

Sources, Field survey, 2016

Average annual income of farmers after E-Wallet scheme

The findings in Table 4b showed 51.2% of thefarmers had annual income >₦350,000 while 18.5%, of the farmers had an annual income between ₦ 201,000-₦300,000. Also, 17.9% of the farmers had annual income of between ₦ 51,000-₦150,000 while 6.7% of the farmers had ≤₦50,000 annual income.The mean annual income of farmers after E-Wallet scheme was ₦5.895,833, this showed thatparticipating in the scheme had strong effectiveness on the income of the participant as supported by Kareem and Akinbile (2015) finding, who reported that the beneficiaries of e-wallet scheme had increases in their income.

Table 4b: Distribution of farmers according to average annual income after e-wallet

Variables	Frequency	Percentages	Mean
≤50,000	16	6.7	
51000-100,000	25	10.4	
101,000-150,000	18	7.5	
151,000-200,000	11	4.6	
201,000-250,000	20	8.3	
251,000-300,000	22	9.2	
301,000-350,000	5	2.1	
>350,000	123	51.2	927,450.00
Total	240	100.0	

Sources, Field survey, 2016

Effect of E-Wallet on the livelihood of participants

Table 5 showed how access to inputs through the scheme had benefitted the farmers. From the table, 34.6% of the farmers in the study area revealed that access to inputs through E-Wallet have enabled them to set up their own business while 30% of the farmers in the study area believed that access to input through the scheme had enabled them to increase their productivity. Also, 28.7% of the farmers in the study area revealed that access to inputs through the scheme had led to increase in their income and standard of living while 12.9% of the farmers revealed that access to inputs through the scheme had enabled them to engage in buying and selling. Furthermore, 12.1% of the farmers believed that access to input had enabled them to spend less annually while 6.2% and 5.0% believed that access to inputs through the scheme led to education of farmers and enabled them to build their own houses. These findings are in consonance with Kareem and Akinbile (2015) where the farmers submitted that access to E-Wallet inputs like rice enabled them to acquire assets, build houses and improved their standard of living generally.

Table 5: Distribution of farmers according to effect of E-Wallet on their livelihoods

Variables	Frequency	Percentage
Increase income and standard of living	69	28.7
Less expenditure	29	12.1
Increase productivity	72	30.0
Building houses	12	5.0
Education and farming	15	6.2
Business	83	34.6
Buying and selling	31	12.9

Sources: Field survey, (2016)
*Multiple responses recorded

Factors that influenced the effectiveness of E-Wallet scheme

Table 6 revealed the factors influencing e-wallet scheme among the farmers in the study area. The coefficient of income 1.04e-07 was positively significant at 1% level of probability, and this implies that increase in income of the farmers led to more participation in e-wallet scheme. It is likely that the E-Wallet scheme in the study area have made adequate financial impact on the beneficiaries, hence, increased their likelihood of participation in the project component. It is inferred therefore that the moderate farm income obtained in the study reflected in this result. This result is in conformity with Akangbe *et al* (2012) that farmers were assisted by various projects to have an increased income, which perhaps increased farmers' participation level in the project components.

Table 6: Factors that influenced the effectiveness of E-Wallet scheme

Variables	Coefficients	Z-value
Age	.0100303	0.61
Sex	.0949257	0.31
Marital status	-.0795958	-0.34
Household size	-.0165553	-0.52
Education	-.0067692	-0.26
Total farm size	-.0810257	-1.35
Income after E-wallet	2.01e-07	3.63***
Redemption center	.5394694	2.38***
Are there redemption centers	2.815432	5.69***
Distance to redemption center	-.2637196	-2.13**
Functional handset	-.4628624	-0.92
Network problem	1.31538	4.07***
Delay in redeeming inputs	.0480971	0.12
Access to fertilizer	1.962752	3.24***
Access to improved seeds	-.9324993	-1.95**
Fertilizer during the scheme	-8.55e-06	-0.09
Improved seed during the scheme	-.0040792	-2.20**

Source: Field survey, (2016)
Log likehood = -32.608861
LR chi square (17) = 164.65
Prob>chi square = 0.0000
Pseudo R^2 = 0.4847
*** = significant at 1% level of probability
**=significant at 5% level of probability

Similarly, the coefficient of network problem (.7656262) was significant at 1% level of probability and was positively significant; this implies that network positively affected the effectiveness of e-wallet scheme. Also, the coefficient of access to fertilizer 1.167676 was significant at 1% level of probability and the coefficient is positive, this implies that access to fertilizer played vital role in e-wallet scheme. Also the coefficient of access to improved seed (-5449756) was negative but significant at 5% level of probability, this might be due to the fact that the farmers did not have access to adequate improve seed. This result is at variance with Yaron *et al*. (2009) which stated that non access to farm inputs negate and may slow down the motive to participate in agricultural programmes and will constrain farmers to adopt the new technologies. Lastly, the coefficient of improve seed during the scheme (-0024661) was also negative but significant at 5% level of probability, this implies that the farmers did not have access to adequate improve seed during the scheme. The coefficient of redemption centers

(.5394694) was positively significant at 1% level of probability; this implies that increase in number of redemption centers will positively influence the participation of E-Wallet beneficiaries in the scheme which implies that availability of adequate redemption centres helped to increase the level of effectiveness of E-Wallet scheme in the study area.

CONCLUSION

The Agricultural Transformation Agenda (ATA) in which E-Wallet was the major component where inputs were supplied to farmers at subsidized prices through their mobile phones was an innovation that was welcomed by many farmers because they were able to access farm inputs easily and cheaper with higher quality that those obtained in the open markets. Many farmers opined that the programme was one government policy that ever touched the life of the ordinary farmer who all the while has never felt the impact of any of programmes of government. The ease in getting inputs at reduced prices really impacted the lives of the farmers positively through increased in income, improved livelihood and helping them to acquire assets. Although, there were challenges faced in the implementation of the programme, these challenges would have been surmounted if the scheme was left to continue but the government that came after abolished it without a concrete replacement, this action has made the farmers to call for the re-introduction of the E-Wallet scheme in order to reduce the hardships faced by farmers in accessing valuable farm inputs.

RECOMMENDATIONS

Based on the major findings of the study the following were recommended:

1. It is recommended that government should increase the quantity of the inputs supplied to the farmers especially fertilizer and herbicides
2. Government should engage more extension workers in the dissemination of information and the working of the E-Wallet scheme
3. The government should re-introduce the scheme, reorganize its operational procedure with the view of making it more effective
4. Government should remove politics and political interference by politicians
5. Government should provide mechanism of monitoring in order to guard against increase in prices by the desk officials and also reselling the inputs by beneficiaries for the purpose of meeting their immediate financial needs
6. Government should encourage the participation of the female gender especially the female headed households in the scheme

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