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EFFECTS OF FERTILIZER PRICE SUBSIDIES ON FERTILIZER USE AMONG FARMERS IN KENYA. A CRITICAL LITERATURE REVIEW

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Abstract

Purpose: Food security is paramount to the well-being of any nation and Kenya having Agriculture as its main stay, needs to increase her food production. The benefits of fertilizer use technology have been communicated variously and efforts to increase fertilizer use are a concern for the government of Kenya. The study is therefore an attempt to generate vital information to supplement the studies that have already been done on increase of fertilizer use to ensure increased food productivity and the effects of fertilizer subsidies

Methodology: The paper used a desk study review methodology where relevant empirical literature was reviewed to identify main themes and to extract knowledge gaps.

Conclusion: Cost of fertilizer, availability of alternatives to fertilizer and weather patterns were found to have negative effects on fertilizer use. Of these three, availability of alternatives had the highest negative effect on fertilizer use followed by the weather patterns. It is interesting to note that the cost of fertilizer had the least effect on fertilizer use in this study.

Recommendations: Alternatives to fertilizer are also seen to strongly, negatively affect fertilizer use, however, any government policy concerning them must be carefully considered given increased productivity that is attributable to alternatives to fertilizer and also the health benefits that are associated with this fertilizer alternatives.

Keywords: *Fertilizer, subsidized prices*

1.0 INTRODUCTION

1.1 Background of the Study

Kenya, a country in the East African region lies across the equator and covers approximately 582,366 square kilometers. Three quarters of the country lies in the arid and semi-arid lands and waste lands in the north and North Eastern regions. The arid and semi-arid often experience dry spells leading to prolonged drought.

As per the 2009 national census, Kenya's population was 37.7million up from an approximate 35.8 million in 2007 and estimated at 39.5million in 2011(Economic Survey, 2012). The poverty level was estimated at 45.9% as at 2006 which was a decline from the 53.6% reported in 2000 (MDG status report for Kenya 2015). Kenya is divided into forty-seven counties of which Bungoma County is the third largest with a population of 1,630,934 and a population density of 454 people per km2 (Kenya County Fact Sheets, 2011). The county is one of the main producers of Maize in Kenya.

With the high poverty in the country as mentioned above, efforts to eradicate extreme poverty and hunger have been initiated though various challenges stand against the efforts; for example poor agronomic practices, low coverage of extension services and affordability of appropriate technologies like fertilizers and hybrid seeds, low value addition, adverse climate changes leading to frequent and intense droughts, floods, re-emergence of diseases and pests.(Millennium Development Goals Status Report for Kenya 2011, Matemilola, 017) Emphasis is on Agriculture because it contributes about 24% of the GDP, 75% of the industrial raw materials and 60% of export earnings and employs an estimate 3.8million Kenyans directly (First Medium Term Plan. 2008- 2012.

To address affordability of appropriate technologies, various strategies have been employed including; Njaa marufuku Kenya, National Accelerated Agriculture Inputs Access Program (NAAIAP) - which assists farmers with fertilizer and seeds, provision of subsidized fertilizer through the National Cereals and Produce Boards (NCPB) and bulk importation of fertilizer through farmers' cooperative Union as a way of boosting their production. The other prominent program at the forefront in addressing the challenges to solving extreme poverty is the Agriculture

Input Supplies Project (AISP) under Global fund Food Crisis Response Program that was implemented between March 2009 and June 2010 to offer subsidy to farmers.

There has not been a single definition for a subsidy, however according to Abdmouleh, (2015) subsidy is a form of assistance provided by the government to a subset of the public that lowers the cost of producing a good or the price that a consumer pays for a good.

1.2 Statement of the Problem

A major objective of Kenya's agricultural policy is to promote food security (Republic of Kenya 2018). Due to increasing population and diminishing agricultural land however, there is imbalance between national food supply and demand. The average production of maize which is the main staple food crop relied on for food security in Kenya for example, averaged 30 million bags in a good year and dropped to 18 million bags in drought years against local demand of 36 million bags (Republic of Kenya 2018). To increase yields, many different studies including Duflo, Kremer, and Robinson, (2015) have been carried out to confirm the effect of fertilizer use on increasing yields, also various studies have been done to confirm the effect of credit availability to influencing fertilizer use.

In Kenya, poor credit and poor input supply abound and as a result, fertilizer use is low owing to its high price attributed to high cost of transportation and poor distribution systems. Fertilizer use in Kenya is about a third of the level used in India and a quarter of the level used in Indonesia (Republic of Kenya 2015).

Governments all over the world variously put out a hand to assist their citizens in market situations so as to improve their lives or encourage them to engage in certain undertakings e.g., to increase use of fertilizer, etc. The government hand could be in the form of subsidies, state aid etc. though this would be against the economists stand for an invisible hand of the market being allowed to work out.

After phasing out fertilizer subsidy programs in the 1990s, several African countries have reintroduced fertilizer subsidies as a means to boost grain yields and rural incomes (Jayne, 2018). A strand of the development literature has further fueled the resolve to revive the case for fertilizer subsidy programs by asserting that they can help poor farmers break out of a low input/low output

poverty trap and kick-start growth processes that can sustainably raise their incomes and assets even after they stop participating in the programs (Durelle, 2015)

In Kenya, the queue on subsidies is being followed down to counties. Bungoma County integrated Development Plan (2013-2017) states that efforts of National, County Governments and development partners should be harnessed to enable farmer's access and use modern agricultural technologies, subsidized farm inputs, light agricultural machineries and Value addition technologies. However, proponents of fertilizer price subsidies need to have a strong basis for pursuing fertilizer price subsidies to influencing fertilizer use contrary to advice against fertilizer price subsidies; given that only a few studies have been done in this area.

1.3 Objectives of the Study

The overall objective of this study is to investigate the effect of fertilizer price subsidies on fertilizer use among farmers in Kenya; that is, the factors that influence fertilizer use and to estimate the effect of fertilizer price subsidies on fertilizer use.

1.4 Significance of the Study

The study is an attempt to generate vital information to supplement the studies that have already been done on increase of fertilizer use to ensure increased food productivity and the effects of fertilizer subsidies. It will confirm to policy makers the significance of fertilizer price subsidies in increasing fertilizer consumption given the identified factors particular to the location of study and so help bridge the information gap as to where they should direct their effort in trying the increase fertilizer use to realize increased food productivity and poverty reduction. Food security is paramount to the well-being of any nation and Kenya having Agriculture as its main stay, needs to increase her food production. The benefits of fertilizer use technology have been communicated variously and efforts to increase fertilizer use are a concern for the government of Kenya (Welime, 2015).

2.0 LITERATURE REVIEW

2.1 History of fertilizer subsidy programs in Kenya

As in many SSA countries, Kenya implemented "universal" subsidy programs from independence in 1963 to the early 1980s when the largely donor-funded projects came to an abrupt end following the adoption of structural adjustment policies (SAPs) (Dorward, 2019; Minot, 2019). These

programs were state-led and succeeded in raising agricultural productivity through use of modern inputs including fertilizer (Badiane, 2015). However, they were phased out largely because they tended to benefit the well-off in the society (Druilhe, 2015). Additionally, the fertilizer subsidy programs were inefficient due to high administrative costs, government monopoly and political influence.

In 1980s and 90s, input markets in Kenya were liberalized following the adoption of SAPs. As a result, fertilizer use declined due to increase in price from Ksh 4 in 1990 to Ksh 24 per kilogram in 2001 (Karanja, 2015). By the end of the 1990s subsidy programs re-emerged in several SSA countries including Kenya, principally to forestall the dismal performance of the agricultural sector due to the negative effects of SAPs (NEPAD, 2016). Through the donor-driven Poverty Reduction Strategy Papers, many SSA countries started implementing "smart subsidies" to raise agricultural productivity. The Abuja Declaration of 2006 provided the continental policy framework for the implementation of "smart subsidies" in Africa (Bunde, 2016). Smart subsidy programs were designed to address the weaknesses of the universal subsidies.

In Kenya, the return of the fertilizer subsidy program in 2066 under NAAIAP (Kiratu, 2015). This program begun with a component called "Kilimo Plus", which was pro-poor and aimed at increasing food production to enhance food security. The beneficiaries in this program were given starter kits comprising of 10 kg certified maize seed, 50 kg of base fertilizer, and 50 kg of top-dressing fertilizer (Megan, 2016). The kit was supposed to aid farmers to cultivate 0.4 hectare of land which was said to be enough to provide food to an average household of five people at an annual maize consumption of 125 kg per capita. The grant was administered through a voucher issued to the farmer (ibid)

Following the 2008 global financial crisis, the GoK initiated the National Fertilizer Subsidy Program in 2009 designed to increase fertilizer use among poor households as well as to cushion them against high fertilizer prices. This program was supported by bulk procurement of fertilizer by the MoAL&F which was then distributed as subsidized fertilizer to farmers (Nzuma, 2016). In this program, the government procured subsidized fertilizers through the NCPB which was distributed to farmers through its depots countrywide after being vetted by the Location Subsidy Fertilizer Vetting Committee.

Although Kenya's fertilizer subsidy programs have had a positive effect on crop yield, household income and poverty reduction (Mason, 2015), studies show that they are fraught with problems associated with poor targeting, rent-seeking, smuggling and diversion to commercial markets (Rotich, 2016). The supply of fertilizer subsidy in Kenya has raised public concerns due to its chronic lateness in delivery, which has led to low fertilizer application rates. Both the intention and the practice of the fertilizer subsidy program may have affected participation in commercial outlets.

2.2 Empirical Review

Siele (2018), conducted a study on the factors influencing access to subsidized fertilizer by maize farmers in Kesses Sub County. This study established the factors influencing access to subsidized fertilizer by maize farmers in Kesses Sub- County, Uasin Gishu County, Kenya. The objectives part of the study was; to establish how targeting strategy of intended beneficiaries, awareness strategy on the fertilizer subsidy program, distribution strategy and price strategy of subsidized fertilizer influence maize production in Kesses Sub-County, Uasin Gishu County, Kenya. The research adopted descriptive survey design and the target population was 22,400 small scale maize farmers, Sub-County Agricultural officer, National Cereals and Produce Board officer. A sample size of 393 small scale maize farmers was sampled using simple random sampling. Purposive sampling was used to select Sub-County Agricultural officer and NCPB officer. Questionnaires and interview schedule were used to collect data and was tested for validity and reliability during pilot study prior to actual data collection. Data was analyzed using descriptive statistics and inferential statistics aided by Statistical Package for Social Sciences (SPSS) and was illustrated by use of frequency distribution and percentages. The results of the study showed that he accessibility of fertilizer unbiased after harvest when farm households tranquil have respectable cash flow had a bigger impact on fertilizer use than a situation in which fertilizer was only available at planting time.

Makau (2016), conducted an assessment of the effect of subsidized fertilizer on farmer participation in commercial fertilizer markets in North Rift Region of Kenya. One of the most outstanding economic issues concerning input subsidies in many third world countries is their effect on commercial fertilizer purchases. This study assessed the level of displacement of commercial fertilizer sales by subsidized fertilizer as well as the factors affecting the quantity of

subsidized fertilizer received by households in the North Rift region of Kenya. A structured questionnaire was used to collect primary data from 1,023 households. Descriptive statistics were used to characterize the fertilizer market in the North Rift of Kenya. A double-hurdle model was employed to assess the effect of subsidized fertilizer on farmer participation in commercial fertilizer market outlets. The results of the study showed that most of the subsidized fertilizer went to the wealthier, male-headed, more educated households with more land and higher non-farm incomes. This means that the beneficiaries of the national fertilizer subsidy were households with the resources to purchase fertilizer from commercial sources in the absence of a subsidy. Reducing the quantity of subsidized fertilizer to the bare minimum is likely to make wealthy households shy away from the subsidized fertilizer thereby allowing poorer households to acquire the subsidized fertilizer. xiii in addition, households with strong social networks with the chair of the village fertilizer subsidy vetting committee received significantly more subsidized fertilizer.

Welime (2014), conducted a study on the effect of fertilizer price subsidies on fertilizer use in Kabuyefwe location of Bungoma county, Kenya. The County is one of the main producers of Maize in Kenya. With the high poverty in the country as mentioned above, efforts to eradicate extreme poverty and hunger have been initiated though various challenges stand against the efforts; for example, poor agronomic practices, low coverage of extension services and affordability of appropriate technologies like fertilizers and hybrid seeds, low value addition, adverse climate changes leading to frequent and intense droughts, floods, re-emergence of diseases and pests. To address increased use of fertilizer which is one of the important technologies needed for increased productivity, the study used panel data of farmers from Kabuyefwe location which was part of the larger Naitiri in Bungoma County, to study the effects of fertilizer subsidy on fertilizer use. A simple regression model was employed in the study. The results of the study showed that the cost of fertilizer, weather patterns and availability of alternatives to fertilizer all had negative effect on fertilizer use, whereas farmer's knowledge, availability of fertilizer at the right time and quantity, land size and the price of the previous crop all had positive effect on use of fertilizer. The study results further indicated that the factors considered were responsible for 89.82% of the variations in the fertilizer use.

2.3 Research Gaps

A knowledge gap occurs when desired research findings provide a different perspective on the issue being discussed. For example, Siele (2018), who conducted a study on the factors influencing access to subsidized fertilizer by maize farmers in Kesses Sub County. The research adopted descriptive survey design and the target population was 22,400 small scale maize farmers, Sub-County Agricultural officer, National Cereals and Produce Board officer. A sample size of 393 small scale maize farmers was sampled using simple random sampling. Purposive sampling was used to select Sub-County Agricultural officer and NCPB officer. Questionnaires and interview schedule was used to collect data and was tested for validity and reliability during pilot study prior to actual data collection. Data was analyzed using descriptive statistics and inferential statistics aided by Statistical Package for Social Sciences (SPSS) and was illustrated by use of frequency distribution and percentages. The results of the study showed that he accessibility of fertilizer unbiased after harvest when farm households tranquil have respectable cash flow had a bigger impact on fertilizer use than a situation in which fertilizer was only available at planting time. On the other hand, our current study focuses on the effects of fertilizer price subsidies on fertilizer use among farmers in Kenya.

In addition to that, a methodological gap can be identified; for instance, Siele (2018), applied the descriptive survey design in studying the factors influencing access to subsidized fertilizer prices by maize farmers in Kesses Sub- County. The results of the study showed that he accessibility of fertilizer unbiased after harvest when farm households tranquil have respectable cash flow had a bigger impact on fertilizer use than a situation in which fertilizer was only available at planting time. On the other hand, our current study focuses on the effects of fertilizer price subsidies on fertilizer use among farmers in Kenya; whereas our current study adopted a desktop study review methodology where relevant empirical literature was reviewed to identify the main themes.

3.0 METHODOLOGY

The study adopted a desktop literature review method (desk study). This involved an in-depth review of studies related to the effects of fertilizer subsidies on fertilizer use among farmers in Kenya. Three sorting stages were implemented on the subject under study in order to determine

the viability of the subject for research. This is the first stage that comprised the initial identification of all articles that were based on the effects of fertilizer subsidies on fertilizer use among farmers in Kenya. The search was done generally by searching the articles in the article title, abstract, keywords. A second search involved fully available publications on the subject of the effects of fertilizer subsidies on fertilizer use among farmers in Kenya. The third step involved the selection of fully accessible publications. Reduction of the literature to only fully accessible publications yielded specificity and allowed the researcher to focus on the articles that related to the effects of fertilizer subsidies on fertilizer use among farmers in Kenya which was split into top key words. After an in- depth search into the top key words (fertilizer, subsidized prices), the researcher arrived at 3 articles that were suitable for analysis.

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knowledge, availability of fertilizer at the right time and quantity, land size and the price of the previous crop all had positive effect on use of fertilizer. The study results further indicated that the factors considered were responsible for 89.82% of the variations in the fertilizer use.

4.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

4.1 Conclusion

The study investigated the effects of other variables on the use of fertilizer other than the input subsidy, the consideration for these other factors was for control purposes given that fertilizer use is not only affected by fertilizer subsidy but rather by several other factors also. The effect of the following factors was therefore put into consideration, cost of fertilizer, price of the preceding produce, farmers' knowledge, fertilizer availability at the right time and quantity, weather patterns, availability of alternatives to fertilizer and size of land.

Cost of fertilizer, availability of alternatives to fertilizer and weather patterns were found to have negative effects on fertilizer use. Of these three, availability of alternatives had the highest negative effect on fertilizer use followed by the weather patterns. It is interesting to note that the cost of fertilizer had the least effect on fertilizer use in this study.

On the other hand, the following factors had a positive effect on the use of fertilizer; fertilizer availability at the right time and quantity, land size, knowledge of farmer, preceding crop price and income respectively. It is of interest that income of a farmer is the least important factor determining a farmer's use of fertilizer given that with a casual eye we see farmers with high incomes using more fertilizer. Indeed, income has a very minimal effect compared to availability of fertilizer for use and land size.

4.2 Recommendations

Fertilizer costs have a negative effect on fertilizer use, given that fertilizer subsidy reduces the cost of fertilizer, it follows that the subsidy counters the negative effect hence is an important contribution to fertilizer use. However, as noted by previous studies, the subsidy programs must be targeted to avoid wastage. The government should not keep pursuing increase of fertilizer price subsidies because as shown from the results, at lower levels, price of fertilizer is not the most important determinant of fertilizer use. Efforts should therefore be directed at such factors like availability of fertilizer at the right time and quantity which was shown to have a strong effect on

the use of fertilizer. In this regard, the Government can put in plans that will encourage improvement of distribution channels which would definitely ensure sustained availability of fertilizer to farmers at the right time and quantity. These may have to do with providing the subsidy amount rather than the subsidized fertilizer which gets distributed by the government. This approach may better encourage development of distribution channels as it allows private persons to engage in distribution yet at the same time allowing farmers to buy at the low costs as a result of subsidy amounts (money) availed.

Size of land under use also had a very strong positive effect on fertilizer use, as such the small holdings should be discouraged and a policy for encouraging large-scale farming encouraged as this would have less administrative costs hence maximize the overall benefits to farmers due to fertilizer use. Equally, minimum size one can hold can be legislated so as to avoid the tendency of individuals subdividing agriculture land to non-productive sizes. Given that weather patterns are found to be negatively related to fertilizer use, it will be prudent to adopt policies that encourage irrigated farming rather than reliance on rain fed agriculture. This may call for efforts by the government to avail adequate water to farmers. Research on how to practice farming under control environment should be pursued so as to avoid being too subjected to natural weather issues.

Further, alternatives to fertilizer are also seen to strongly, negatively affect fertilizer use, however, any government policy concerning them must be carefully considered given increased productivity that is attributable to alternatives to fertilizer and also the health benefits that are associated with this fertilizer alternatives.

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