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Effects of Fertilizer Subsidy on the Yield of Crops among Rural Farmers in Sudan Savannah and Guinea Savannah zones of Ghana

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Agriculture is the mainstay of the economy of Ghana. The Government has given special attention to the sector to play a leading role in the economic development of the country. The role of the sector is an engine of economic development and depends upon other things on sustainable use of the land resource. This study was carried out in the Sudan Savannah (Bawku and Navrongo) and Guinea Savannah (Tolon kumbungu and Walewale) zone of Ghana to assess the effect of fertilizer subsidy on yield of crops among rural farmers. Data was collected from randomly selected households by administering questionnaire and a descriptive statistics consisting of simple percentages, frequencies, means and tables, were used to examine the socio- economic characteristics of farmers. The arithmetic mean was used to find the average farm size per acre and output per acre of beneficiaries and non-beneficiaries of the fertilizer subsidy program. Results of the analysis showed that 93% of the sampled farmers were men. Land ownership of the farmers was known to affect their farming activities. Evidence from this study reveals that (63%) of the farmers were sole owners, (13%) hired, (25%) family, 68% belong to farmers group and 32% do not belong to any association. The percentage of beneficiaries of the fertilizer subsidy program was 68% and that of the non-beneficiaries was 32%. The average output per acre of the beneficiaries of the fertilizer subsidy program were16.15kg/acre maize, 7kg/acre soybean, 41kg/acre rice and 8kg/acre groundnut and average output per acre for the non-beneficiaries of the fertilizer subsidy program were 12.38kg/acre maize, 2.25kg/acre soybean, 8.5kg/acre rice and 5kg/acre groundnut. The average output per acre of the beneficiaries before the fertilizer subsidy program were 16.15kg/acre maize, 7kg/acre soybean, 40.4kg/acre rice and 8kg/acre groundnut and that of the beneficiaries output per acre after the fertilizer subsidy program were 19.54kg/acre maize, 8kg/acre soybean, 29kg/acre rice and 4.2kg/acre groundnut. Majority 93% of the farmers were aware of the fertilizer subsidy program and few were unaware of the fertilizer subsidy program7%.

Keywords: Sudan Savannah, fertilizer, subsidy, output, agriculture, beneficiary.

INTRODUCTION

Agriculture is the mainstay of the economy of Ghana. The Government has given special attention to the sector to play a leading role in the economic development of the country. The role of the sector is an engine of economic development and depends upon other things on sustainable use of the land resource. The agricultural sector plays a key role in the overall economic growth and development of Ghana and employs about 50.6

percent that is 4.2 million of the country's population. In 2008 the fertilizer subsidy program was established to help farmers increase their rate of fertilizer application as a means of increasing crop productivity as well as increase the country's fertilizer application. During the 2013 farming season, farmers were made to bear the international cost and local transportation cost of the delivery of fertilizers while government subsidized it by over 21 percent. A 50 kilogram (kg) bag of Nitrogen, Phosphorus and Potassium (NPK) fertilizer that same year cost about GH ¢ 71.50 and farmers were expected to pay GH ¢ 51.00. In 2014, same bag of NPK fertilizer and Urea cost GH ¢ 95.00, while Sulphate Ammonia costs GH¢ 85.00. (My joy online, 2014).

Universal price subsidies on fertilizers were common from the 1960s to the 1980s in sub-Saharan Africa and in Asia. In Asia, subsidies are considered to have played an important role in promoting increased use of fertilizer and to have partly contributed to the significant increases in yields (Morris *et al*., 2007), although their contribution to agricultural growth and poverty reduction after the initial phases is considered to have been very low (Fan *et al*., 2007). In Africa, most countries sold fertilizer at subsidized prices through a centrally controlled input importing and distribution system. Variations on this system were used in Ghana, Kenya, Malawi, United Republic of Tanzania, Zambia, and Zimbabwe and in some West African countries up to the mid-1990s in some cases (Crawford *et al.*, 2006).

Experience with universal subsidies in Sudan Savannah Africa was largely negative: it resulted in inefficiencies, such as adverse selection of programmed beneficiaries (capture by influential/well-off farmers) and displacement of commercial sales, and had disproportionate fiscal costs against their benefits (Morris *et al*., 2007). This failure, together with a shift of development paradigms towards structural adjustment, eventually led to the dismantling of fertilizer subsidies, the liberalization of most fertilizer markets and a switch of fertilizer policy towards supporting the development of private-sector-led markets (Minot, 2009). However, even during that period voices claiming a role for limited subsidies remained (Reardon *et al*., 1996). Many observers note that the removal of subsidies coincided with a reduction in food production and in fertilizer use (Banful, 2011). As Banful and Olayide (2010) note for Nigeria, "*the pattern of total fertilizer consumption has followed the ebb and flow of federal and state government subsidies*". Interestingly, the country abandoned universal subsidies as late as 1997 to resume with reformed subsidy programs as early as 1999.

From the early 2000s onwards, the conjunction of agricultural production stagnation, rising food insecurity, low soil fertility and environmental degradation has sparked fresh interest, from policy makers and development partners alike, in promoting input subsidies as a tool for addressing food insecurity. African governments and development partners have embraced the increase of fertilizer use as an enabling technology to boost food production.

A milestone in the surge of fertilizer subsidies, the African Fertilizer Summit held in 2006 in Abuja stated in its final declaration (African Union, 2006) that African policy-makers should grant "targeted subsidies in favor of the fertilizer sector, by granting, with the support of Africa's Development Partners, targeted subsidies in favor or the fertilizer sector". Since then the African Union, through NPCA, is monitoring the progress towards the goals set in the Abuja Declaration and is coordinating the establishment of an African Fertilizer Development Financing Mechanism (AFFM). AGRA also advocates for making available improved seeds and fertilizers that are subsidized by governments and delivered through the private sector to poor farmers. Last, the Millennium Villages programmed also called for governments to boost fertilizer use, with subsidies if necessary (Minot, 2009). The fertilizer industry seems to be more cautious, reducing the scope for fertilizer subsidies to certain cases; acknowledging that subsidies alone will not be effective without a broader enabling environment supportive of agricultural development; and highlighting the need for more fertilizer supporting policies such as reduced taxation, regulatory harmonization and better infrastructure (IFA, 2010). Last, but not least, fertilizer subsidies are being put forward for inclusion into the Food Aid Convention as support to post-emergency recovery efforts to rehabilitate adversely affected agriculture sectors (Konandreas, 2010).

The Malawian government pioneered the return to fertilizer subsidies in 1998 when it started distributing free fertilizer after having discontinued similar programs in the early 1990s. It was followed by Nigeria (1999); Zambia (2000); the United Republic of Tanzania (2002), Kenya (2006) and Ghana (2008). After the 2008 food and fertilizer prices crisis, subsidies have become all the more popular as governments have felt the urge to quickly improve domestic food production and have been able to use direct budget support from donors who were previously reluctant (Kelly *et al*., 2011). Importantly, they also remain an attractive policy option for national governments because they are visible and popular with voters. This study was carried out in the Sudan Savannah (Bawku and Navrongo) and Guinea Savannah (Tolon kumbungu and Walewale) zone of Ghana to assess the effect of fertilizer subsidy on yield of crops among rural farmers.

MATERIALS AND METHODS

Data Type, Source and Sampling

Random sampling was used to select four communities

Table 1. Personal and household characteristics of farmers

Variable	Frequency	Percentage (%)
Sex		
Male	37	93
Female	3	7
Age distribution		
20-29	4	10
30-39	10	25
40-49	13	33
50-59	6	15
60-69	3	2
70-79	4	5
Land ownership		
Sole	25	63
Hired	5	13
Family	10	24
Farmer group		
Yes	27	68
No	13	32

Source: field survey, 2014

and 10 households per community from Sudan Savannah (Bawku and Navrongo) and Guinea Savannah (Tolon kumbungu and Walewale) zone of Ghana. The research design and data collection involved both primary and secondary sources. Primary data was collected from the sampled household by administering questionnaire. The questionnaires captured information on the personal characteristics such as age, farmer based organization, land ownership, farmer group in the area. Age was computed in years. Various questions were prepared to gather information on household characteristics such as farm size (acre) was also captured. Secondary sources include published and unpublished information about the study area and from the internet. The secondary information was collected from the Ministry of Food and Agriculture, KNUST libraries, and the internet.

Analysis

A descriptive analysis consisting of simple percentages, frequencies, means, tables, were used to examine these socio- economic characteristics of farmers. The arithmetic mean was used to find the average farm size per acre and average output per acre of beneficiaries and non-beneficiaries of the fertilizer subsidy program.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Household

Approximately 93% of the sampled farmers are men. The socio-economic characteristics of the household as presented in Table 1 have important implications for agricultural productivities. Out of the 40 farmers interviewed in the study, male households head constituted majority (93%). The minimum age of the farmers is 20 and the maximum 70 and the average age is 33 indicating that young people are more involved in farm activities in the area.

Land ownership of the farmers is known to affect their farming activities. Evidence from this study reveals that (63%) of the farmers are sole owners, (13%) hired, (25%) family,68% belong to farmers group and 32% do not belong to any association as shown in Table 1 below.

Beneficiaries of the fertilizer subsidy program

From Table 2, the percentage of beneficiaries of the fertilizer subsidy program were 68% and that of the non-beneficiaries were 32%. This implies that farmers who are beneficiaries (68%) of the fertilizer subsidy program will increase their rate of fertilizer application as a means of increasing crop productivity as well as increase the country's fertilizer application. This affirms to the study than in Asia, who found out those subsidies are considered to have played an important role in promoting increased use of fertilizer and to have partly contributed to the significant increases in yields (Morris *et al*., 2007).

Average Output per acre of Beneficiaries and Non-beneficiaries of fertilizer subsidy program

The major food crops grown were maize, soybean, rice

Table 2. Beneficiaries and non-beneficiaries of the fertilizer subsidy program

Frequency of beneficiaries	Percentage of beneficiaries	Frequency of non-beneficiaries	Percentage of non-beneficiaries
27	68	13	32

Source: field survey, 2014

Table 3. Average output per acre of beneficiary and non-beneficiary of fertilizer subsidy program

crops	Average farm size (acres)	Average output per acre of beneficiary (kg)	Average output per acre of non-beneficiary (kg)
Maize	0.32	16.15	12.38
Soybean	0.06	7.00	2.25
Rice	0.16	41.00	8.50
Groundnut	0.80	8.00	5.00

Source: field survey, 2014

Table 4. Average output per acre of beneficiary before and after subsidy program

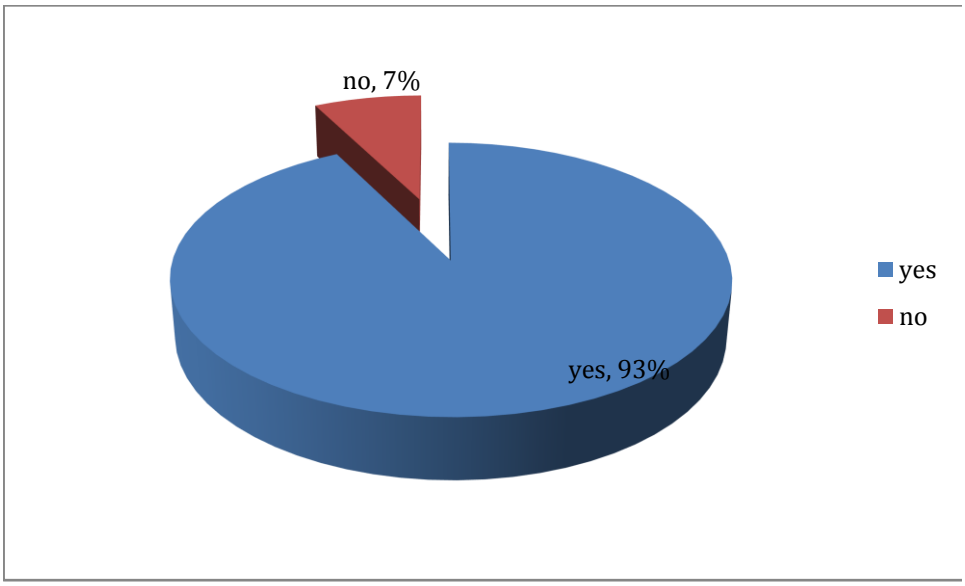
Crops	Average farm size (acres)	Beneficiary average output per acre before subsidy (kg)	Beneficiary average output per acre after subsidy (kg)
Maize	0.32	16.15	19.54
Soybean	0.06	7.00	8.00
Rice	0.16	40.40	29.00
Groundnut	0.80	8.00	4.20

Source: field survey, 2010

and groundnut. The average farm sizes for the beneficiaries and non-beneficiaries of the fertilizer subsidy program were 0.32 acre, 0.06 acre, 0.16 acre and 0.80 acres as shown in Table 3 below. The average output per acre of the beneficiaries of the fertilizer subsidy program were: 16.15 kg/acre for maize, 7 kg/acre soybean, 41 kg/acre rice and 8 kg/acre groundnut and average output for the non-beneficiaries of the fertilizer subsidy program were maize 12.38 kg/acre, soybean 2.25 kg/acre, rice 8.5 kg/acre and groundnut 5 kg/acre. From the Table 3, the average output per acre of the beneficiaries of the fertilizer subsidy program was much higher than that of the non-beneficiaries. This implies from the study that, the beneficiaries benefited a lot from the fertilizer subsidy program as they were able to increase production. This is in line with the study done in Asia that subsidies are considered to have played an important role in promoting increased use of fertilizer and to have partly contributed to the significant increases in yields (Morris *et al*., 2007).

Average output per acre of beneficiary before and after subsidy program

From Table 4, it shows the average output per acre of the beneficiaries of the fertilizer subsidy program before and after the subsidy. The crops grown among the farmers were maize, soybean, rice and groundnut. The average farm sizes in acres were 0.32 acre, 0.06 acre, 0.16 acre and 0.80 acre respectively. The average output per acre of the beneficiaries before the fertilizer subsidy program were 16.15kg/acre maize, 7kg/acre soybean, 40.4kg/acre rice and 8kg/acre groundnut and that of the beneficiaries outputs per acre after the fertilizer subsidy program were 19.54kg/acre maize, 8kg/acre soybean, 29kg/acre rice and 4.2kg/acre groundnut. The beneficiaries average output per acre of maize after the fertilizer subsidy program19.54kg/acre maize outweighs that of before the fertilizer subsidy program 16.15kg/acre maize, 8kg/acre soybean after the fertilizer subsidy program was also more than that of before the fertilizer subsidy program 4.20kg/acre soybean, rice 40.40kg/acre before the fertilizer subsidy program outweighs that of after the fertilizer subsidy program and that of groundnut after subsidy 4.2kg/acre. This implies that maize and soybean farmers after the subsidy were able to increase their food crop production and benefited from the fertilizer subsidy program than rice 40.40kg/acre and groundnut 8kg/acre farmers before the subsidy program also increase their



Source: field survey, 2014
Figure 1: Awareness of fertilizer subsidy program

production without benefiting from the fertilizer subsidy program.

Awareness of fertilizer subsidy program

From Figure 1, it shows that majorities 93% of the farmers are aware of the fertilizer subsidy program and few are unaware of the fertilizer subsidy 7%.

CONCLUSION AND RECOMMENDATION

The study revealed that 93% of the sampled farmers were men, the percentage of beneficiaries of the fertilizer subsidy program was 68% and that of the non-beneficiaries was 32%. The average output per acre of the beneficiaries of the fertilizer subsidy program were 16.15kg/acre maize, 7kg/acre soybean, 41kg/acre rice and 8kg/acre groundnut and average output per acre for the non-beneficiaries of the fertilizer subsidy program were 12.38kg/acre maize, 2.25kg/acre soybean, 8.5kg/acre rice and 5kg/acre groundnut. The average output per acre of the beneficiaries before the fertilizer subsidy program were 16.15kg/acre maize, 7kg/acre soybean, 40.4kg/acre rice and 8kg/acre groundnut and that of the beneficiaries average output per acre after the fertilizer subsidy program were 19.54kg maize, 8kg/acre soybean, 29kg/acre rice and 4.2kg/acre groundnut. Majority 93% of the farmers were aware of the fertilizer subsidy program and few are unaware of the fertilizer subsidy 7%.

In view of the findings, an attempt by the government to scrap subsidies on fertilizer will be disastrous for agricultural sector. Hence the government should support the farmers by making the subsidized fertilizers available to them and should be supplied to them on time to be able to use to cultivate their farmlands which will lead to increase yields.

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