

Agricultural Sources of Information and Intensity of Inorganic Fertilizer Use among Farmers in Uganda

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Summary: Although more than 70% of Uganda's workforce is engaged in agriculture, the country has one of the highest levels of soil nutrient depletion and only 5% of farmers use fertilizers. This study examines the effects of information sources on farmers' use of inorganic fertilizer. The intensity of inorganic fertilizer use among farmers who get their agricultural information from radio, television, newspaper, and extension workers is higher than that of farmers who had other sources of information. Also influencing the intensity of inorganic fertilizer use were the type of transport used, access to transport type, and type of seeds used. This study shows that agricultural policies on fertilizer use should be streamlined, taking into consideration different sources of agricultural information, especially the use of radio, television, newspapers, extension workers, and farmer-to-farmer communication, to ensure a boost in agricultural production.

Introduction

Fertilizer use is crucial in raising and sustaining agricultural production, enhancing food security, and thus reducing persistent poverty (Apori and Byalebeka, 2021; World Bank, 2018; Namazzi, 2008). Fertilizers can improve soil characteristics, enable plant growth and performance, and increasing food security (Randive et al., 2021). Although agriculture is the mainstay of Uganda's economy, employing more than 70% of the population, the country has one of the highest levels of soil nutrient depletion. Only 5% of farmers use fertilizers (World Bank, 2018). What drives this minimal rate of adoption remains unclear. This study investigates how sources of agricultural information, such as radio, television, internet, newspapers, and extension services, influence the intensity of inorganic fertilizer use among Ugandan farmers.

Research Approach

This study relied on secondary data from the 2018 Annual Agricultural Survey (AAS) (UBOS, 2018). We merged datasets on inorganic fertilizer use, households, sources of agricultural information, transport, household members, and plot roster using the R programming language. Only 800 farmers used inorganic fertilizer, so we considered intensity of inorganic fertilizer use as our dependent variable. Since intensity of inorganic fertilizer use was continuous, we employed a multiple linear model to determine how farmers' agricultural source of information influences their intensity of inorganic fertilizer use. In this same model, we also considered other control variables, such as type of transport, type of access to transport for example owned, borrowed or hired, cost of fertilizer use, and type of seed used to determine how these factors influence intensity of fertilizer use, apart from agricultural sources of information. Intensity of inorganic fertilizer use is measured as the ratio of total fertilizer used by farmers to total area (plot size) in liters per hectare.

The data for dependent variable was highly skewed, and we did a log transformation on this variable. This was done to ensure that the assumption of multiple linear regression models was not violated. Since the dependent variable was log-transformed, we interpreted our results to say that a unit increase in the considered independent variable is associated with an average of 100x (regression coefficient) % increase in the intensity of inorganic fertilizer use.

Table 1.1: Factors affecting intensity of inorganic fertilizer use

Variable	Coefficient	<i>p</i> -value	95% confidence interval
Source of information			
Radio	2.37	0.06*	(-0.09 – 4.82)
Telephone	1.23	0.51	(-2.43 – 4.88)
Extension workers	1.45	0.27	(-1.12 – 4.02)
Farmer to farmer	2.96	0.02**	(0.47 – 6.13)
NGOs	2.67	0.06*	(-0.22 – 5.47)
Television	2.09	0.04*	(-2.43 – 4.88)
Word of mouth/peers	2.12	0.10	(-0.39 – 4.63)
Newspaper	2.09	0.49	(-0.39 – 8.07)
NAADS	3.19	0.03*	(0.25 – 6.13)
Marital status			
Married	0.86	0.00***	(0.24 – 5.06)
Widowed	-0.56	0.42	(-1.94 – 0.82)
Transport type			
Car/pickup	3.54	0.00***	(2.31 – 4.77)
Donkey	6.65	0.00***	(4.30 – 9.01)
Head/back loading	2.43	0.00***	(1.87 – 2.98)
Lorry	3.28	0.00***	(1.49 – 5.07)
Motorcycle	1.36	0.00***	(0.73 – 1.99)
Oxen	1.92	0.47	(-3.26 – 7.10)
Tractor	2.34	0.01**	(0.71 – 3.97)
Wheelbarrow	2.38	0.01**	(0.49 – 4.27)
Type of access to transport			
Own	2.05	0.00**	(0.75 – 3.35)

Hired	2.65	0.00***	(1.36 – 4.00)
Type of seed used			
Improved	5.12	0.00***	(0.24 – 1.64)
Purchased seed for planting			
Purchased seed	0.70	0.00***	(0.25 – 1.13)

Note: Intensity of fertilizer use is measured in liters per hectare. N = 800. Significance at the 10%, 5%, and 1% levels is indicated by *, **, and *** respectively. NAADS is National Agriculture Advisory Services. Head/ back loading means buying fertilizers and carry them either on head or back.

Main Findings

The results of this analysis, showing the impact of various factors on farmers' intensity of use of inorganic fertilizer, are shown in Table 1.1.

Farmers who obtained agricultural information from radio, farmer-to-farmer communication, NGOs, and television showed a greater intensity of inorganic fertilizer use than did farmers who used other sources of information, to a statistically significant degree. These results could be attributed to the fact that many farmers can easily acquire and get access to radios and their fellow farmers. In addition, Uganda has many NGOs that support farmers in innovative farming technologies, including the use of inorganic fertilizer, and a great deal of agricultural information has been disseminated to farmers through both local and international television. Most local television programs are in local languages, and farmers can easily understand their instructions about how and when to use inorganic fertilizers.

Marital status also has a statistically significant effect on farmers' intensity of inorganic fertilizer used. One possible explanation is that married farmers may have large families they need to feed, and fertilizer use enhances yields and productivity.

The intensity of inorganic fertilizer use is influenced by a farmer's transport type as well. Farmers whose transport type is car or pickup use a higher intensity of inorganic fertilizer than farmers who use bicycle transport. Type of access to transport has a statistically significant effect on the intensity of inorganic fertilizer used by a farmer. This is attributed to the fact that cars/pickups, lorry, motorcycle, and tractor are means of transport that can easily be bought or hired by farmers.

Furthermore, the intensity of inorganic fertilizer used by a farmer who owns or hires the transport type is higher than that used by a farmer who borrows a transport type. This implies that asset ownership reduces the transport-related transaction costs of purchasing inputs from traders and that these assets can act as a farmer's financial capital and be used as collateral when the farmer accesses bank credit.

Additionally, use of improved instead of traditional seeds has a statistically significant effect on the intensity of inorganic fertilizer used by a farmer.

Policy Implications

Evidence from this study shows that the agricultural policies on fertilizer use should be streamlined taking into consideration different sources of agricultural information especially the use of radio, television, newspapers, extension workers, and farmer to farmer to ensure a boost in agricultural production. We recommend that governments and other agriculture stakeholders should focus on advertising through different communication media to reach out to farmers on the importance of fertilizer use in farming and a lot of agricultural information should be disseminated to farmers through both local and international television.

References

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