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Are Ugandan Farmers Using the Right Quality Inorganic Fertilizers?

Swaibu Mbowa, Kizza Charles Luswata, and Komayombi Bulegeya

Executive summary

This brief highlights the quality concerns of inorganic fertilizers on the Ugandan market. The findings reported are an excerpt from a study that analysed the quality of inorganic fertilizers on the Ugandan market¹. The analysis was based on 170 samples (in 50 kg bags and small 1-2 kg packs) of the commonly used fertilizers on the Ugandan market i.e. urea, NPK, DAP and CAN were purchased and subjected to a laboratory analysis. Procedures followed in the purchasing of fertilizer samples mimicked a farmer purchasing fertilizers randomly from any input dealer country wide. Analytical results from the fertilizer samples revealed low quality fertilizers with moisture content above acceptable limits of 0.5-1.5 percent; and untruthfulness in both weight and nutrient content. In some instances, the nutrient content quoted on the labels did not match with the analytical content. This has serious consequences because fertilizer recommendations are based on the nutrient content. If the nutrients are not of the right quality, then the end-user (a farmer) will not attain the intended crop response to fertilizer application. The study findings reveal that re-packaging fertiliser into smaller quantities is justifiable to meet the requirements of smallholder farmers, but leads to loss of nutrients (especially nitrogen); and also aggravates the high moisture content problem. Results reveal gaps in the current regulatory system; therefore there is an urgent need for government to approve and operationalize the fertilizer policy, regulations and strategy.

Introduction

The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) regulates agricultural chemicals including fertilizers, deriving its mandate from the Agricultural Chemicals (Control) Act, 2006. The Department of Crop Protection is the Secretariat and has put in place both Inspectors and other facilities to enforce the law although with minimum capacity. MAAIF acknowledges the need for increased fertilizer use in order to address the problem of declining soil fertility to increase crop production, and food security as well as household incomes. Fertilizer use in Uganda is one of the least globally because majority of Ugandan farmers are resource-constrained, with very low capacity to afford inputs such as fertilizer. Only eight percent of farming households use inorganic fertilizer². Currently, use of fertilizer in Uganda is very low (at about 1



kg of nutrient per hectare per year)³, compared to Kenya (32 Kg/ha); Rwanda (29 kg/ha); and Tanzania (6kg/ha)⁴. The already poor situation is exacerbated by challenges of poor fertilizer quality on the market. The few farmers who have tried out fertilizers claim they do not fully realize the anticipated benefits thus raising concerns that the losses they experience are partly a result of using poor quality farm inputs, including fertilizer. This brief highlights limitations in the country's fertilizer regulatory and control system. These relate to capacity to ensure that there is compliance to set standards of proper handling; storage and delivery of quality fertilizers by key players in the supply chain (importers, wholesalers and retailers) in the country.

Methodology



The sampling design covered both the import; wholesale; and retail levels of the fertilizer supply chain. At the *import/wholesale level* four shops were randomly selected in Kampala (the country's hub of the fertilizers supply chain). At the *Retail level* (country-wide) sampling - Two districts were randomly selected from each of the four regions—*Central region* (Kampala and Masaka); Northern (Gulu and Lira); Eastern (Mbale and Kapchorwa); Western (Kisoro and Masindi). Within each district, the input dealers/stockists were categorized into three groups: (a) the MAAIF registered-officially certified input traders; (ii) membership to UNADA

an umbrella organization for input dealers (herein after the UNADA registered); and (iii) unregistered (*illicit*) input dealers that are neither licensed by MAAIF nor members under UNADA. In each group, *one* shop was randomly selected giving a total of three retail shops per district.

The study focused on the commonly used fertilizer types in Uganda - Urea, DAP, NPK, MOP and CAN. Two types of samples were purchased – bulky samples of 50 kgs and small packs of 1-2 kgs of each of the above fertilizer type. At the import/wholesale level - 13 bags of the bulky sample were purchased. And 63 bulky samples were likewise purchased from the retailers in addition to the 89 small packs. This resulted in 170 (81 bulky bags and 89 small packs) which were delivered to one of the nationally recognized laboratories in the country. The laboratory is located at Makerere University, College of Agricultural and Environmental Sciences' Department of Agricultural Production. The samples were stored in a well-ventilated place on top of dry non-metallic (asbestos) sheets to prevent moistening. All the necessary precautions were taken during transit and storage to ensure that the samples are not damaged.

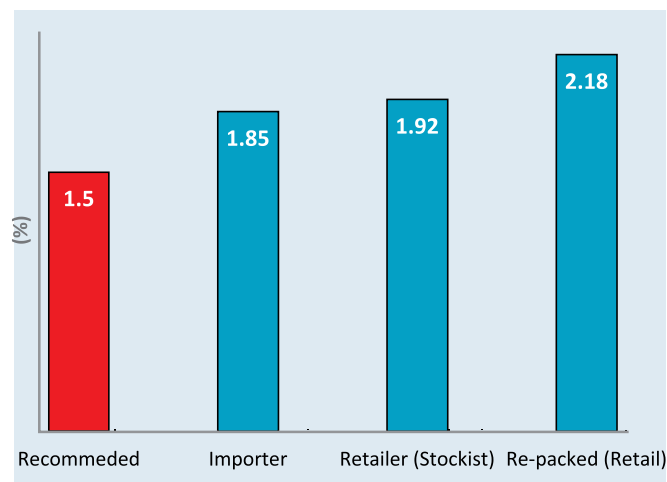
Study Findings

Moisture Content

Fertilizer quality standards cover both physical and chemical characteristics. The physical characteristics (i.e. packaging; moisture content; and weight of the bags) are indicative of the quality of fertilizer⁵. But fertilizer samples procured on the Ugandan market right from import to the retail level of the supply chain show moisture content figures above the threshold of 0.5-1.5% range - indicative that fertilizers contained high levels of moisture (Figure 1), hence of poor quality in this respect.

Figure 1 further reveals that the practice of Agro-dealers at retail level to re-pack fertilizers into smaller weights (1-2kg) increases moisture levels

Figure 1: Average Fertilizer Moisture Content, %

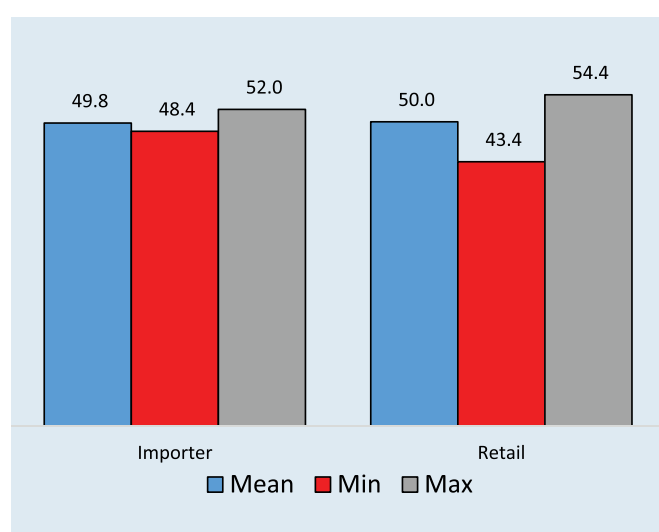


in the fertilizers. The stockists are compelled to repackage because fertilizers are imported in weights which smallholder farmers cannot afford.

Weight

Figure 2 reveals that some of the 50kg fertilizer bags sold were underweight (43.4 kg) – which is below the threshold of 49.5 kg recommended under the Fertilizer Control Regulations (June 2012)⁶.

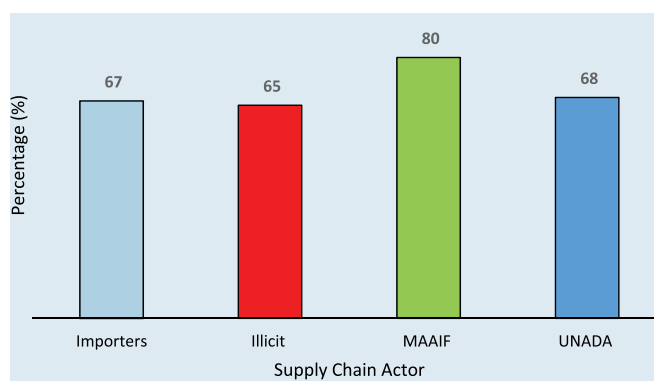
Figure 2: Range Weight of 50 kg Fertilizer Bags



Effectiveness of Regulatory Controls

Figure 3 provides an extended analysis in which samples of fertilizers procured from supply chain actors (importers; MAAIF registered and unregistered; and UNADA members) are re-classified on the basis of compliance to the weight (the 50 Kgs), and the acceptable moisture content limits of 0.5-1.5%. A sample is considered non-compliant if found lacking in either dimension (moisture content or weight). It is observed in Figure 3 that 67 percent of samples from importers; 65 percent from unregistered MAAIF retailers; 80 percent from MAAIF registered shops; and 65 percent from UNADA members were non-complaint. Thus there is no exemplary difference in quality between samples procured from MAAIF registered input retailers; unregistered traders; and UNADA members (Figure 3). The 80 percent non-compliance of samples procured from MAAIF registered input traders, implied that inspectors pay less attention in enforcing fertilizer quality control measures among input stockists who are registered by MAAIF.

Figure 3: Proportion (%) of Non-Compliant (50 Kg Bag) Fertilizer



Chemical Characterization of Fertilizer Samples

The chemical composition of the fertilizers was analysed guided by the outlined nutrient content on the label of each fertilizer sample. The results presented in Figures 4 to 7 provide insights on the quality of fertilizer right from importers, and what

is retailed in the country.

The size of the bar in Figures 4 to 7, represents the quantity of respective nutrient content in the fertilizer sample procured from a particular supply chain actors’ store (i.e. importer; MAAIF or UNADA registered; and or unregistered dealers), located in the different part of the country. The study also encountered misleading labelling of fertilizer bags on the market (Box 1).

Nitrogen (N) in Urea and DAP Samples

The study results (Figure 4) reveal that the nitrogen content in Urea imported was within the acceptable minimum range of 45-46 percent except for samples from the Mth importer. The labels on the bulky (50kg bag) samples of the Urea fertiliser indicated that it constituted 46 percent of nitrogen. Figure 4 further reveals that the nitrogen content in the bulky samples of Urea sold at the retailed is of satisfactory quality. The exceptions were for samples purchased from the MAAIF registered traders in Masaka (43.5 percent) and Gulu (44.6 percent), and the unregistered trader in Kampala (6 percent) and Kapchorwa (55 percent). It is worth noting from Figure 4 that, the nitrogen content in Urea decreases in small packs retailed by agro-input dealers. This gives an indication that perhaps re-packaging leads to adulteration of Urea. It not possible to see a clear pattern on the impact of licensing by MAAIF, and or membership to UNADA on the quality of Urea sold.

For DAP fertilizer (Figure 5), the quality of DAP imports was of good quality in terms of nitrogen content – matching the 18 percent indicated on the labels. However, there are wider variations in

the nitrogen content in DAP across the sampled districts. The draft Fertilizer Control Regulations (2012)⁷ provide for acceptable range for minimum Ammonical nitrogen content by weight (dry basis) of 16-18 percent. Considering this regulatory provision, only retail traders in Kisoro district sold bulky bags of the right nitrogen content (Figure 5). Just like for Urea, it is worth noting that no clear pattern is evident to trace the impact of re-packaging - and licensing by MAAIF, and or membership to UNADA on the quality of DAP sold. Some of the samples contained nitrogen above the threshold level (e.g. the small sample procured from Kampala with 52.8 percent. This further exposes wider inconsistencies in the untruthfulness in labeling of fertilizers on the Ugandan market.

Box 1: Case of Misleading Labelling in Mbale District

- The Label indicates NPK fertilizer with a nutrient content of 25:5:5+5S.
- In brackets the same label, indicated the fertilizer was MOP.
- It should be noted that MOP is not a compound fertilizer and it only contains potassium.
- The same label breaks down the nutrients showing water soluble phosphate (P_2O_5) as 60% contrary to what is in the main formulation of 25:5:5.



Figure 4: Nitrogen Content in Urea

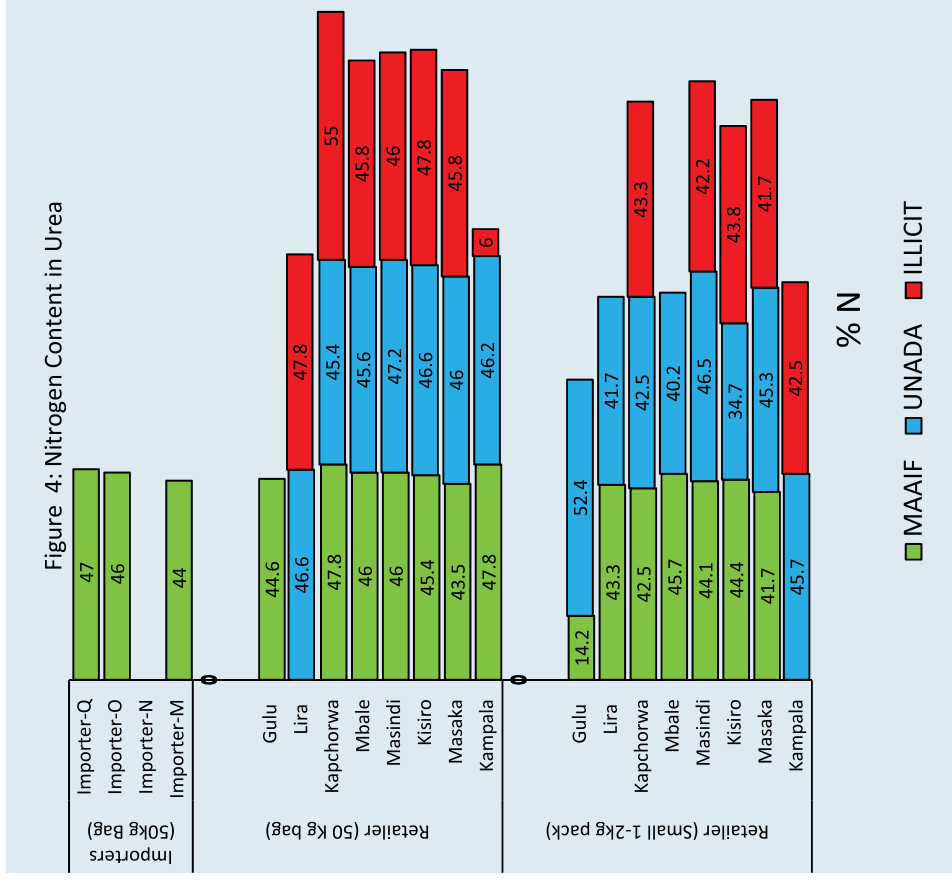
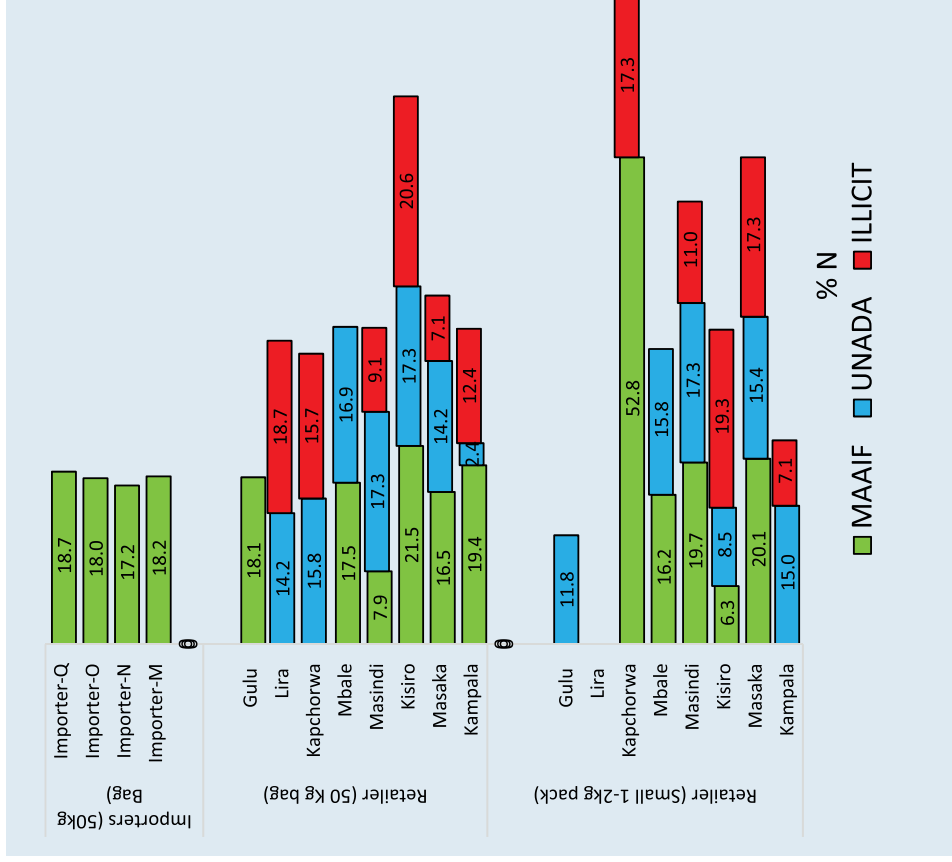


Figure 5: Nitrogen content in DAP



Source: Fertilizer Quality Assessment Survey (November, 2014)

Figure 6: Nitrogen content in NPK 17:17:17

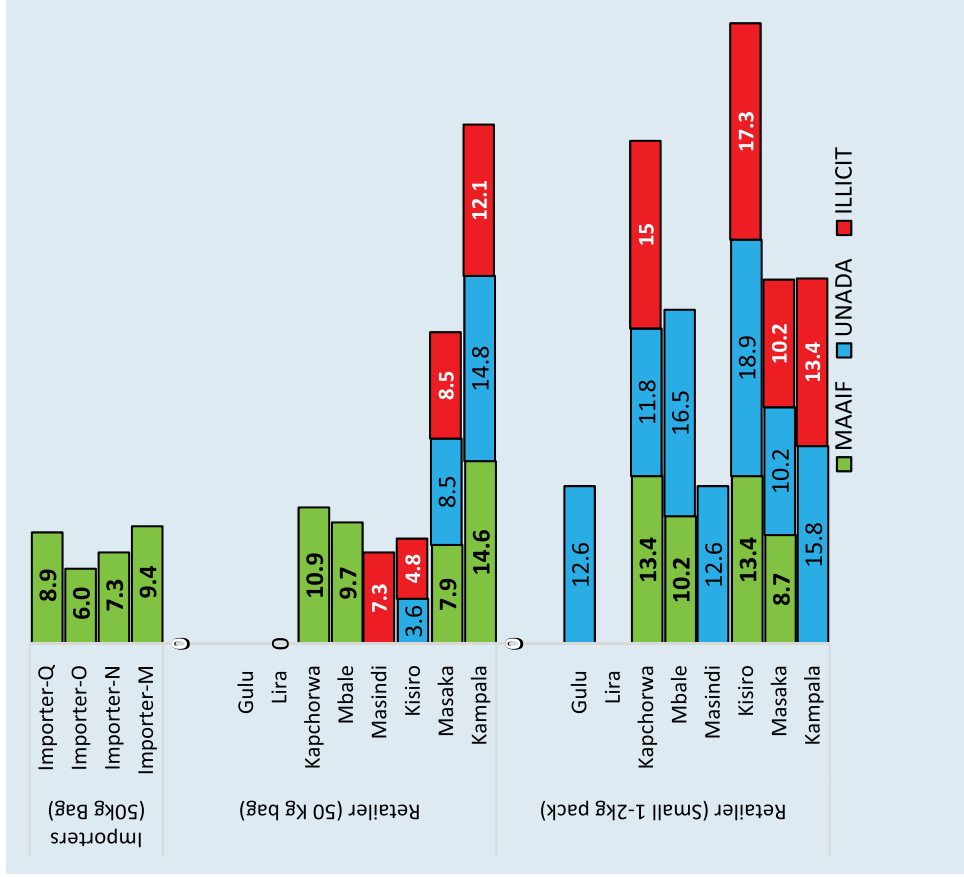
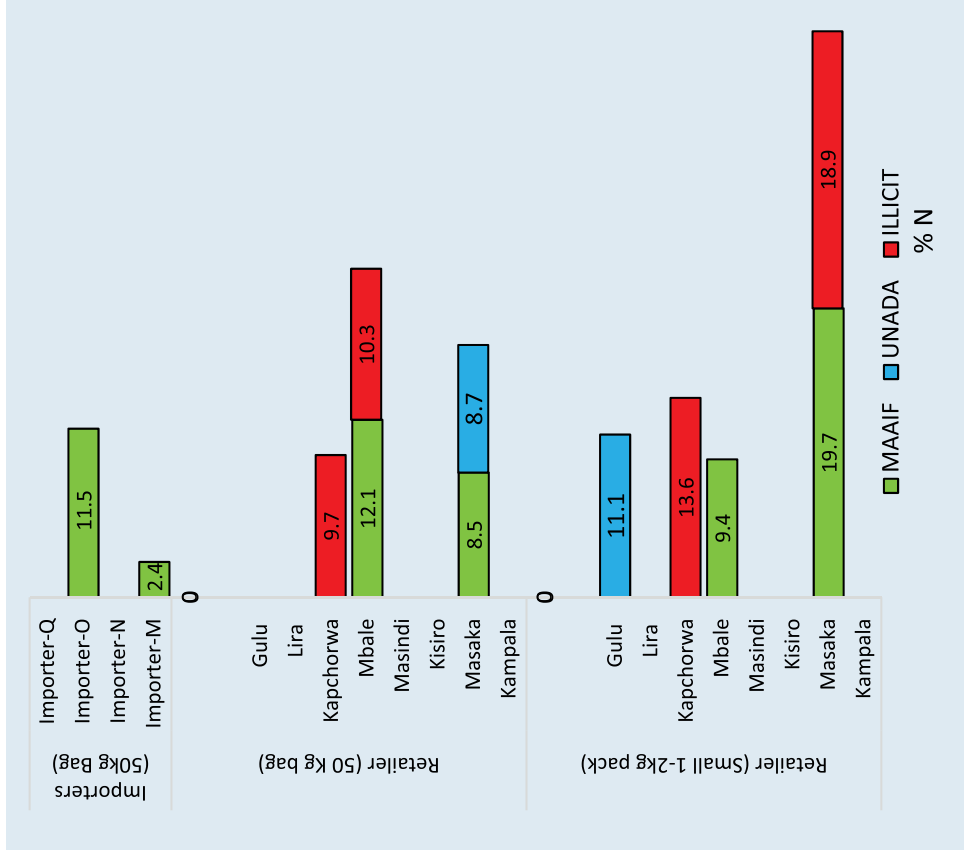


Figure 7: Nitrogen content in CAN



Source: Fertilizer Quality Assessment Survey (November, 2014)

Nitrogen (N) in NPK 17:17:17 and CAN Samples

Sample results (Figure 6 and 7) reveal that the nitrogen content of NPK and CAN fertiliser imported was below the specified content on the labels. Nitrogen content in the NPK fertiliser was in the range of 6-9.4 percent well below 17 percent indicated on the labels. None of the bulky NPK samples *retailed* had the nitrogen content specified on the labels.

Interestingly, results reveal that small packs of NPK had higher and better Nitrogen content than bulky samples across all study districts irrespective of the registration authority. This creates a complicated scenario whose cause is not very clear. The nitrogen content for the CAN fertilizer imported ranged between 2.4 – 11.5 percent; while both the bulky (50 kg bags) and small (1-2 kg packs) recorded nitrogen content level ranging from 8.5 – 19.7 percent against the labelled value of 26 percent. The NPK and CAN fertilisers had the poorest quality in terms of nitrogen content.

Conclusions and way forward

The study unveils evidence of fertilizer bag labeling on the Ugandan market - which is inconsistent with the nutrient content. In some instances, the nutrient content quoted on the labels did not match with the analytical content implying a high rate of quality inconsistencies even at import level. The inconsistencies are more prevalent with DAP, NPK and CAN fertilizers. This has serious consequences because fertilizer recommendations are based on the nutrient content and if the nutrients are not of the right quality, then the end-user (a farmer) will not attain the intended crop response to fertilizer application. The study reveals that a

farmer purchasing a 50kg fertilizer bag from an Agro-input dealer across the country is likely to pick a bag below or above the threshold weight (of 49.5 kg); and with moisture levels above the recommended threshold range (between 0.5-1.5 percent).

It is difficult to underpin the most critical level where fertilizer quality is tampered with because deviations in quality were widespread along the entire supply chain. Even at the importer/wholesale level, there were cases where lapses in fertilizer quality were observed. Therefore, it follows that the quality of imported inorganic fertilizer is suspect. Implying that either overseas manufacturers deliberately manufacture low nutrient fertilizer, or the importers are unable to establish the quality of fertilizer imported into the country. It is likely that low quality fertilizer act as a disincentive to fertilizer use and could be one of the factors contributing to Uganda being among the World's least users of fertilizer.

Re-packaging of fertiliser is justifiable on grounds that it enables small-holder farmers to access fertilisers. However, the practice leads to lowering the nutrient like nitrogen in the fertilizer. This is costly to an already resource-constrained small-holder farmer. In view of these findings and given the underdevelopment fertiliser market in Uganda, the need to put in place a stronger regulatory framework cannot be overemphasized. Thus, the urgent need to strengthen the fertilizer inspection unit in MAAIF to be able to routinely monitor the quality of fertilizers at all levels of the fertilizer market chain. All these could be achieved by the operationalization of the Fertilizer Policy, Fertilizer Regulations and National Fertilizer Strategy, which are yet to be tabled before cabinet for approval.

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About the Authors

Swaibu Mbowa is a Senior Research Fellow at the Economic Policy Research Centre, Kampala, Uganda.

Kizza Charles Luswata is a part time lecturer in Soil Science, a PhD Fellow, Department of Environmental Management, Makerere University.

Komayombi Bulegeya is the Commissioner, Department of Crop Protection in the MAAIF.

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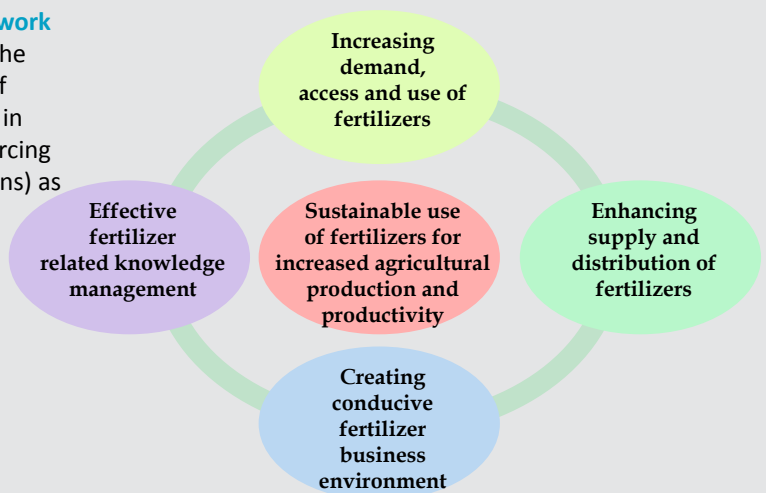
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Uganda’s Fertilizer Policy (UFP)

The fertilizer policy operates under the mandate of MAAIF within the broader objective of the agricultural development agenda. The policy advocates for a partnership between the Ugandan government and the private sector. The major roles of government are to provide an enabling environment and incentives for the private sector to flourish. Making fertilizers available and affordable to the end users as a step towards meeting the Abuja Declaration commitment of at least 50kg/ha/year by 2015. The private sector is expected to take a lead in the manufacture, procurement, importation, distribution, marketing and use of fertilizer while following the regulatory framework herein.

The strategic framework

The framework for the operationalisation of the NFS is anchored in four mutually reinforcing pillars (priority actions) as illustrated.



Vision of the fertilizer policy

The vision of the policy is “an efficiently functioning fertilizer industry in Uganda that is friendly to farmers and the environment”.

Mission of the fertilizer policy

The mission of the policy is “to have a competitive and profitable fertilizer industry that provides affordable and accessible fertilizer to the farmers for increased and sustainable agricultural productivity and farm incomes.”

Overall objective of the policy

The objective of the UFP is to contribute to increased agricultural productivity and profitability through increased and sustainable access and use of fertilizers.

Endnotes

- 1 Kizza Charles Luswata and Swaibu Mbowa (March 2015). The Quality of Fertilizers on Ugandan Market: Evidence for Stronger Regulations. Report of the fertilizer quality survey conducted between September and November 2014, Funded by the Alliance of a Green Revolution in Africa (AGRA) undertaken by the Economic Policy Research Centre (EPRC) in collaboration with MAAIF - Department of Crop Protection.
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- 3 MAAIF (March 2014) Draft Uganda National Fertilizer Sub-Sector Development Strategy and Investment Plan (NFS): 2014/15 - 2018/19). Republic of Uganda. Ministry Of Agriculture, Animal Industry And Fisheries (MAAIF), March 2014.
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- 5 MAAIF (October, 2014). Training Manual on Use of Fertilizers in Uganda. Republic of Uganda, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), Government Publishers. October, 2014.
- 6 MAAIF (June 2012). Draft Fertilizer Control Regulations 2012; Made Under Section 18 of the Agricultural Chemicals (Control) Act 2006 (Act No. 1 of 2007). Republic of Uganda, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).
- 7 MAAIF (June 2012). Draft Fertilizer Control Regulations 2012; Made under Section 18 of the Agricultural Chemicals (Control) Act 2006 (Act No. 1 of 2007). Republic of Uganda, Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

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Address:
Economic Policy Research Centre
Plot 51, Pool Road, Makerere University Campus
P.O. Box 7841, Kampala, Uganda
Tel: +256-414-541023/4
Fax: +256-414-541022
Email: eprc@eprc.or.ug