

# Does Pesticide Use Influence Crop Productivity in Uganda?

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## Introduction

Pests have damaging effects on crop yields, and consequently household welfare and food security. In Uganda, crop losses due to pests and diseases amount to are estimated at US\$ 35-200 million (bananas), US\$60-80 million (cassava), US\$10 million (cotton), and US\$8 million (coffee) annually (PARM, 2017). Yet, the 2019/2020 Uganda National Panel Survey (UNPS) reports that only 6% of Ugandan farmers use pesticides which include insecticides, herbicides, acaricides among others. Though the dependence on pesticides is growing significantly in Africa, it is very low in Uganda as compared to other countries like Tanzania, Nigeria, and Ethiopia where according to Sheahan and Barrett (2017) pesticide use stood at 13%, 31%, and 33% respectively.

Despite the benefits, some studies explain that the indiscriminate use of pesticides on food crops lowers food quality and reduces yields in Uganda (Ngabirano and Birungi, 2020). While studies confirm that proper use of pesticides can prevent large crop losses, and thus increase crop productivity (Popp et al., 2013), analytical gaps still exist on the types and sources of pesticides used in Uganda. In addition, there is also inadequate literature showing the relationship between pesticide use and crop productivity in Uganda. Numerous studies have delved into the analysis of factors influencing crop productivity among smallholder farmers in various developing nations (Obasi et al., 2013; Mango et al., 2017; Mekuriaw et al., 2018; Myeni et al., 2019). However, there remains a notable gap in investigating the relationship between pesticide adoption and crop productivity in Uganda. The empirical gap identified motivates the study to examine the effects of pesticide use on crop productivity.

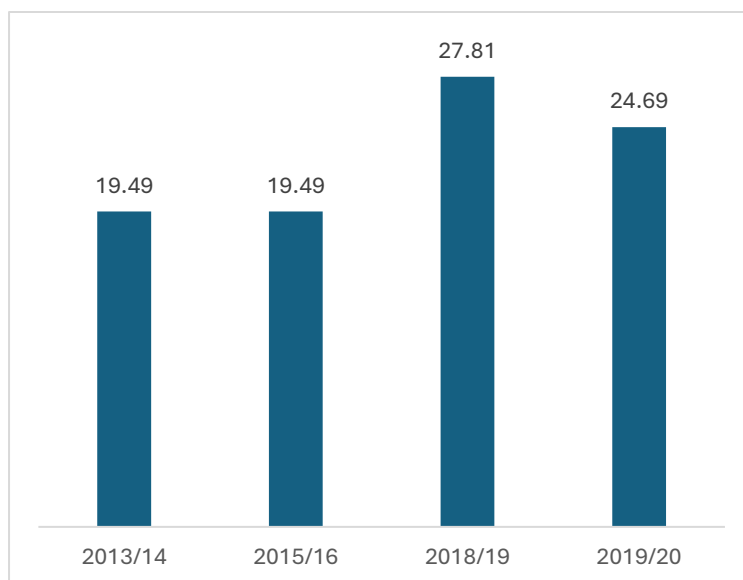
This policy brief makes use of data from the Uganda National Panel Survey (UNPS)-2015/2016, 2018/19, and 2019/20 to examine the types and sources of pesticides used and pesticide use effect on crop productivity in Uganda. We begin the analysis by first examining the determinants of pesticide use in Uganda.

## Findings

**The share of households that use pesticides has been fluctuating over time.** The study observes an increase from 19.49 percent in 2015/2016 to 27.81 percent in 2018/19. However, there is a marked reduction in pesticide use between the two waves from 27.81 percent in 2018/19 to 24.69 percent in 2019/20 (Figure 1).

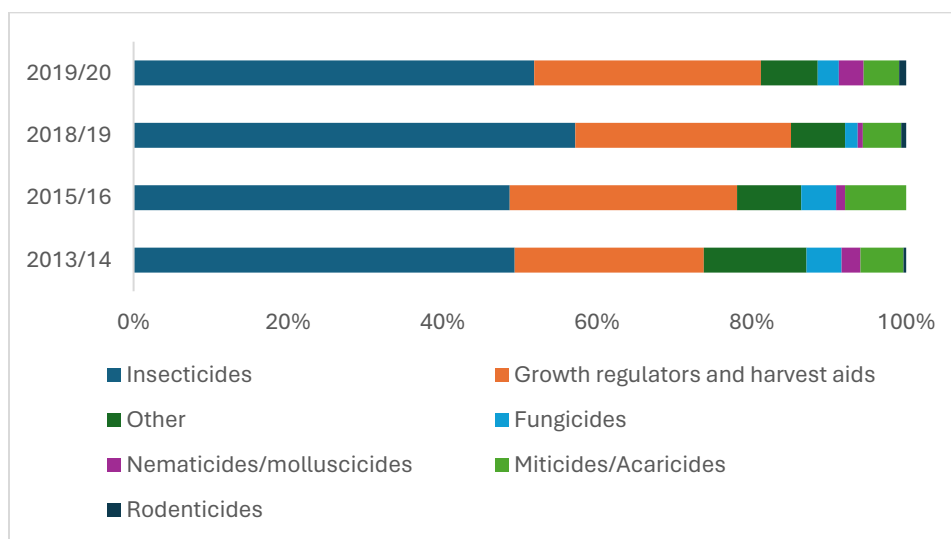
## Key Facts

- The primary pests affecting crops in Uganda are insects.
- 97% of households purchase pesticides from private traders in the local/village market.
- Pesticide use increases crop productivity by 1.8 kgs per acre.
- Inorganic fertilizer use reduces crop productivity.



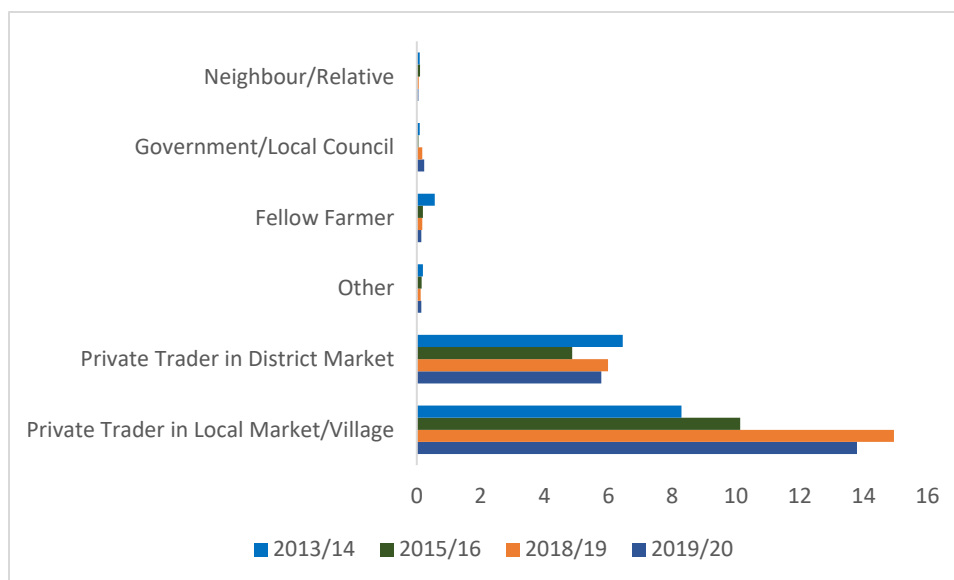
**Figure 1:** Share of households that use pesticides  
*Source: Authors construction, (UNPS Data)*

Over the years, **the majority of those that use pesticides often use insecticides** closely followed by growth regulators and harvest aids (Figure 2). This suggests that the primary pests affecting crops manifest as insects, and pesticides are employed to manage them by either eliminating or deterring their undesirable and destructive behaviors that pose a threat to food production.



**Figure 2:** Type of pesticide used by different households  
*Source: Authors construction, (UNPS Data)*

The majority of the households source their **purchase from private traders in the local/village market** followed by private traders in the district market. This signifies that the quality of pesticides sold for income generation is predominantly influenced by individual actors at the local level in village outlets, as opposed to government-led, large-scale financing of pesticide distribution, thus constraining subsidies for high-quality pesticides.



**Figure 3: Purchase of pesticides**  
*Source: Authors' construction, (UNPS DATA)*

The results show that **pesticide price, gender of household head, extension services, mechanization, use of improved seedlings, and organic and inorganic fertilizer use are significant determinants of pesticide use in Uganda.** Pesticide price and gender have a negative and significant relationship with pesticide use. This means that as the price of pesticides increases, its use decreases. Households that have access to extension services, use machines, use improved seedlings, use organic fertilizer, and use inorganic fertilizer are more likely to use pesticides. Access to extension services provides farmers with knowledge of the different technologies such as pesticides that increase their chance of applying such technologies. Moreover, households that are open to adopting one technology are more likely to adopt different technologies.

**Households that use pesticides have a higher crop productivity compared to households that do not use pesticides as pesticide use increases crop productivity by 1.8 kgs per acre.**

Besides pesticide use, the study confirms that inorganic fertilizer use also influences crop productivity. However, crop productivity decreases with inorganic fertilizer use. Specifically, households that use inorganic fertilizer exhibit a 62.4 percentage point reduction in crop productivity compared to households that do not use inorganic fertilizer.

**Table 1: Pesticide use boosts crop productivity**

Variables	Overall Crop Productivity
Pesticide	1.805*** (0.653)
Inorganic fertilizer	-0.624* (0.319)

## Conclusion

Despite the escalating threats posed by pest-related crop damage, the adoption of pesticides in Uganda remains disproportionately low. The empirical findings show that only 22.4% of Ugandan farmers use pesticides, presenting a stark contrast to the heightened prevalence of pesticide use observed in countries such as Nigeria (Sheahan and Barrett, 2017).

Overall, the reliance on purchasing pesticides from private traders at the village level potentially compromises quality and standards, given that these transactions may be for profit generation and often lack regulatory oversight.

The utilization of judiciously applied pesticides demonstrates a positive impact on crop productivity within the context of Ugandan agriculture. Empirical evidence from the study affirms that households engaging in pesticide use exhibit a heightened likelihood of experiencing increased crop productivity. Consequently, the absence of effective pest control measures places farmers at risk of substantial crop losses to pest infestations.

## Priority actions for policy consideration

- a) Reform and strengthen the regulatory framework surrounding pesticide trade in Uganda. The government should establish a licensing system that mandates private local market dealers to attain certification before the sale of pesticides given that the majority of the households purchase their pesticides from private traders in the local/village market which might expose farmers to counterfeit pesticides on sale due to lack of stringent criteria for license.
- b) Strengthen awareness of, access to, and responsible use of insecticides (and other control methods) among farmers. Given that insects are the main pests damaging crops and pesticides are employed to manage them by either eliminating or deterring their undesirable and destructive behaviors, limited knowledge and access to quality insecticide can deter insecticide control and thereby reduce crop productivity.
- c) Sensitize farmers on the negative effects of inorganic fertilizer on crop productivity. Given that households that use inorganic fertilizer exhibit a 62.4 percentage point reduction in crop productivity compared to households that use organic fertilizer, efforts should be geared towards creating awareness among farmers so that they are deterred from using inorganic fertilizers.

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