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# ASSURING SAFE PESTICIDE USE FOR COMMERCIAL CROPS, INCLUDING SOYBEAN, IN SUB-SAHARAN AFRICA

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Increased agricultural productivity is widely viewed as being critical to the development of a nation's economy. Key among the tools for increasing agricultural productivity is input use, which includes fertilizers, soil amendments, improved seed, and pesticides. Pesticide use, and herbicide use, specifically, additionally has important implications for the labor force. Weeds are estimated to produce potential yield losses of 34% globally, highlighting the importance of effective weed management (Oerke, 2006). In many parts of Sub- Saharan Africa, weeding is manually carried out by women and children. While other Integrated Weed Management practices such as crop rotation and mulching should always be incorporated into the farming system, herbicides can play an important role in alleviating the burden of weeding on women and children.

Nonetheless, all pesticides should be used judiciously to minimize human and environmental health impacts, particularly given the increasing popularity of pesticides in Sub-Saharan Africa.

While adoption levels of fertilizers and improved seed are more commonly addressed in the literature, knowledge of pesticide application rates in Sub-Saharan Africa is limited (Snyder, Cairns Smart, Goeb, & Tschirley, 2015). Pesticide use appears to be increasing in Sub-Saharan Africa but the lack of household-level analyses makes the picture of pesticide use unclear (Ibid.). Using data provided in the Living Standards Measurement Study (LSMS) from the World Bank, Sheahan and Barrett (2014) found that an average of 16% of farming households in six Sub-Saharan African countries use pesticides (Table 1). Although rates of pesticide use varied from country, rates recorded in the LSMS data were higher than those reported in earlier literature (Ibid.). In the case of herbicides, both availability and affordability of inputs have increased in recent years as patents have expired and Asian suppliers have begun providing herbicides in African markets (Haggblade, Minten, Pray, Reardon, & Zilberman, 2017). Herbicide adoption rates vary widely throughout Sub-Saharan Africa, with only one percent of farmers in Malawi applying herbicides, while herbicide application is much more common in Ghana, where 55 percent of farmers use herbicides (Haggblade et al., 2017; Sheahan & Barrett, 2017). As more pesticide products become available and at lower prices they will be accessible to a larger number of farmers (Haggblade et al., 2017). Increased pesticide availability in conjunction with lax regulatory environments in many Sub-Saharan African countries exacerbate human and environmental health concerns (Snyder et al., 2015). Pesticide safety training, therefore, becomes even more critical in the face of these challenges.

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**Table 1: Percent of cultivating households using agro-chemicals (pesticides, herbicides, and/or fungicides)**

| | % of cultivating households using any agro-chemical | By type (if full set provided) | | | 1st- most important type | 2nd – most important type |
|---|---|---|---|---|---|---|
| | | Pesticide | Herbicide | Fungicide | | |
| Ethiopia | 30.5 | 8.4 | 27.2 | 3.5 | - | - |
| Malawi | 3.0 | - | - | - | Insecticide | Herbicide |
| Niger | 7.8 | 1.9 | 0.7 | 5.5 | - | - |
| Nigeria | 33.0 | 18.2 | 21.9 | - | - | - |
| Tanzania | 12.5 | - | - | - | Herbicide | Pesticide |
| Uganda | 10.7 | - | - | - | Insecticide | Herbicide |
| *Average* | *16.3* | - | - | - | - | - |

Notes: First and second most important types are household-reported in Malawi, Tanzania, and Uganda where use rates by type are not provided (observed at plot level). The "average" row includes simple (unweighted) averages across the statistics reported at the country level.

*Source: Sheahan & Barrett (2014)*

As soy increasingly becomes a commercial crop in Sub-Saharan Africa, use of pesticides and other inputs will also increase (Goldsmith, 2017). In order to avoid the pitfalls of increased pesticide use in cash crop systems, such as those seen in cacao producers (Sosan, Akingbohungbe, Durosinmi, & Ojo, 2010), more emphasis needs to be placed on pesticide safety training at both the extension worker and farmer levels (Goeb, Dillon, Lupi, & Tschirley, 2017). Pesticide safety should be an integral part of any agricultural extension training program, regardless of personal views on pesticide use. Most extension agents will encounter farmers using pesticides at some point in their career and should thus be able to make well-informed recommendations to ensure safe and judicious pesticide application.

Pesticide use will likely continue to increase in Sub-Saharan Africa regardless of pesticide safety interventions. It is, therefore, critical to provide extension workers and farmers with the knowledge needed to safely and effectively apply pesticides should they choose to do so. Human health and environmental challenges associated with pesticides can be minimized through proper training on pesticide safety and Integrated Pest Management systems. Pesticide applicators should also receive the training needed to identify the threshold at which pesticide application is justifiable and implement non-chemical pest management practices into their farming systems. To address these concerns, the Soybean Innovation Lab has developed a free, online, certificate-based Integrated Pest Management and pesticide safety training course. The course can be accessed at https://soybeaninnovationlab.getlearnworlds.com/course?courseid=ipm. Organizations such as CropLife International, a consortium of agro-chemical producers, including Bayer, BASF, Corteva, and Syngenta, also provide free information on pesticide safety and Integrated Pest Management. These and other extension interventions can help inform farmers about the potential pitfalls of pesticide use and reduce the risk of human health impacts and environmental contamination.

Governments, non-governmental organizations, and the private sector all benefit from increased pesticide safety and should increase partnerships to maximize farmer and extension worker knowledge and capacity surround pesticide use.

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