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Hans H. Ruthenberg Award for Graduates 2023

Louis Schwarze “Governance of pesticides in Zambia”, University of Hohenheim, 2022

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Summary

Farming in Sub-Saharan Africa, long considered “organic by default” (Andersson & Isgren, 2021), is now witnessing a rapid adoption of pesticides in many countries, a trend that has been coined pesticide “revolution” (Haggblade et al., 2017)¹. Drivers are, on the one hand, the mass-supply of locally branded, low-cost, generic pesticide formulations imported from Asian manufacturers and, on the other hand, rising pesticide demand due to structural trends such as high pest pressure, rising cost of manual labour, and commercialization of farming. In principle increased adoption of pesticides could improve food security and rural livelihoods by reducing pre- and post-harvest losses and drudgery of farming, but in practice this is overshadowed by rampant health and environmental problems such as pesticide poisoning, contamination of food and water and loss of biodiversity. Underlying problem is the ubiquity of injudicious management practices and hazardous pesticides, incentivized by market failures that are left unaddressed by regulatory institutions such as legislation, enforcement, capacity development and impact monitoring due to various governance challenges. Regulatory capacities are further strained by the ongoing proliferation of pesticide volumes, brands, and traders, including problems such as counterfeiting, and informal trade. While these problems have been raised in the context of the "pesticide revolution", the underlying obstacles to an enabling institutional environment for sustainable pesticide use (i.e., governance challenges) are still poorly understood and conceptualized. Addressing the pesticide governance challenges in SSA could greatly help to prevent excessive sustainability trade-offs when intensifying food systems for food security.

The thesis addressed these knowledge gaps first theoretically by development of a conceptual framework, disentangling governance challenges of private, public, and civil actors along the pesticide lifecycle, comprising the six steps Import, Repackaging, Distribution, Use, Disposal and Food Markets. Taking Zambia as a case study, the framework was then applied utilizing four consecutive steps of qualitative data collection. First, Zambian pesticide laws and policies were desk reviewed and benchmarked with international reference documents to identify eventual gaps in their design and implementation. Second, by use of 13 Process-Net Maps, a stakeholder mapping technique, influence levels, governance processes and bottlenecks were mapped following the pesticide life cycle. Based on the emerging findings, 87 key informants (KIs) representing diverse stakeholders were interviewed to further specify critical aspects.

¹ According to FAO (2020) pesticide imports to SSA have sextupled between 2000 and 2020.

Finally, pesticide management practices and perceived impacts of pesticides were assessed in 18 focus group discussions with 159 randomly sampled farmers, using Participatory Impact Diagrams (PIDs). Complementary insights were gained through site observation of pesticide markets and interviews with pesticide traders. Data was collected between October and December 2021 in the capital Lusaka at the national level as well as at the local level in four districts in the Eastern Province.

Results of the PIDs reveal as either very positive (37.5%) or positive (24%) perception of local pesticide net-impacts by farmers. Yet, many were also undecided between positive and negative impacts (37.5%) while only 2 participants (1%) rated the net-impact negatively. Pesticides' positive reception is underpinned by the high frequency and relevance key benefits were raised by farmers, including higher yields and less risks due to effective crop protection (81%/2)², reduced time and workload of farming freeing-up capacities for economic diversification or social activities (88%/2), as well as enhance food security through long-term preservation of grain (81%/2). Negative impacts in contrary were more diverse but mentioned less frequently and with less relevance. Most tangible to farmers were temporary lesions (e.g., skin and eye irritations, headaches and vomiting) (88%/1.6), suicides (81%/0.5)³, risk of chronic diseases (e.g., cancer) and contamination of food and animal feeds (both 69%/1.1). Other slightly less frequently mentioned impacts were loss of util flora and fauna such as edible insects, edible weeds, bees (50%/1.6) and hunting and fishing with pesticides (50%/0.6) resulting in killing of wildlife, less diverse diets and loss of food sovereignty. Pesticides may also result in less diverse farming systems because of anti-synergies with cover- and intercrops and crop rotations (25%/1.5).

FGDs and KIs confirmed that inadequate pesticide handling (67%⁴) and knowledge (73%) are major governance challenges at farm level. Other related challenges are use of HHPs (67%), low adoption protective equipment (PPE) (63%) and integrated pest management (OPM) (27%), deliberate dumping of pesticides (containers) (47%) as well as build-up of resistances (16%) which lead to health (53%) and environmental hazards (33%). These behavioural challenges were theoretically linked to three types of market failures - externalities, imperfect information and bounded rationality. Due to externalities users do not account for hazards to collective goods such as public health and environmental safety. Access to information on safe/effective pesticide use and potential risks is a merit good and underlies high transaction cost. Hence it is provided in less quantity and quality than socially desirable. Imperfect information leads to bounded rationality because farmers tend to underestimate risks while overestimating benefits of pesticides due to cognitive biases such as optimism and normalcy bias as well as misperception of likelihood.

Concerning the supply chain of pesticides many KIs confirmed the “pesticide revolution” hypothesis, i.e., a rapid expansion of pesticide consumption an associated emergence of many new pesticide traders and trademarks. This has been further reinforced through pesticide subsidies. In consequence, pesticides have become more affordable and accessible to farmers, but various trends that deteriorate pesticide supply chain governance were detected. Local importers and trading companies with affordable pesticide house brands increasingly gain market shares at the disadvantage of international premium suppliers like Bayer or Syngenta.

² Numbers in brackets show first the share of groups (n=18) by which the impact was mentioned and the average relevance rating the impact received (2 being most relevant, 1 conditionally relevant and 0 irrelevant).

³ Some impacts like suicides and fishing with pesticides received low relevance score because they were considered a deliberate misuse for which the user was considered responsible rather than the pesticide.

⁴ Percentages indicate the share of KIs that mentioned this challenge (n = 87).

However, business models of generic suppliers exclude investments in corporate social responsibility, capacity building and stakeholder dialogue. For instance, while premium suppliers phased out HHPs, generic importers keep stocking them. At the retail level, many upcoming vendors are in suburbs and rural areas and are characterized by their small size, informality and low qualification. Sometimes pesticides are even sold by street/mobile dealers or ordinary kiosks. Three major governance challenges of pesticide traders were highlighted by KIs - low qualification (49%), misleading advice and hawking (29%), and counterfeiting (24%). The major underlying market failure is information asymmetry due to which farmers cannot access quality of advice and products supplied by pesticide dealers. This leads to adverse selection whereby provision of substandard services is more competitive and hence incentivized. One characteristic phenomenon was hawking, nudging and cheerful marketing of pesticide without mentioning risks (i.e., "selling pesticides like biscuits"). On food markets information asymmetry incentivizes the neglect of pre-harvest intervals and sale of pesticide residue contaminated food (60%) which was related to a severe case of food poisoning in Zambia.

Results of Process Net-Maps show that the cause for rampant challenges of pesticide supply and use is the complete or partially absence of public pesticide governance along all stages of the pesticide life cycle which can be attributed to two major sets of governance challenges.

First, the legal review showed that pesticide legislation is largely unaligned to international standards and HHPs are not banned (53%). Mandates are not operationalized and key topics omitted. Moreover, pesticides are not featured in current agricultural and environmental policies. Primary reason is lack of political will (18%) to tighten and update regulations caused by imperfect information (evidence) about the true social costs in combination with low accountability due to untransparent and inert policy processes (27%). Civil society organizations (CSOs) are not participated and too weak to hold private and public representatives accountable publicly. Furthermore, being a joint matter of environmental, health and agricultural ministries, pesticide regulation is side-lined and suffers from coordination failures (11%). Regulatory capture from the private sector could be another reason but was not explicitly observed.

Second, enforcement and impact monitoring mandates and capacities are not aligned (57%) and hence inspectors are "thin on the ground". Major governance challenges here are again lack of political commitment to provide sufficient resources in terms of staff, vehicles (53%) and laboratories (33%) but also transaction cost-intensive due to spatial fragmentation, and inconsistent and bureaucratic coordination between agencies (42%). Consequentially, inspections of pesticide dealers and border controls are very infrequent (56%), pesticide quality and food contamination are not monitored (49%) and training of pesticide dealers and farmers is anaemic and completely left to the private sector (56%) while environmental impacts are only registered on complaint basis.

To alleviate extensive challenges of pesticide governance in Zambia fostering political will for stricter regulation and enforcement will be essential, especially to fully ban HHPs. Here, international organisations & research have much influence on domestic policy makers (20%), e.g., by coordinating stakeholder forums, elaborating alternative policies, providing research evidence and supplementary funding. Consensual strategies are needed to empower and participate CSOs (13%) to overcome collective action problems and demand for stricter pesticide regulation while barriers to private-public collusion must be installed. To reduce transaction costs of enforcement, hybrid models integrating private, public and civil governance could be more effective. Regional harmonization of pesticide legislation within the

Southern African Development Community (SADC) could free-up valuable capacities by on registration and border control.

In conclusion, the Zambian case suggest that governance challenges in face of an unfolding “pesticide revolution” are rampant but if national governments take an (pro-) active role in concerted multi-stakeholder efforts that are supported by innovative policy models, chance s are high to avoid a gloomy scenario of high trade-offs between sustainability and food security when intensifying food systems.

References:

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