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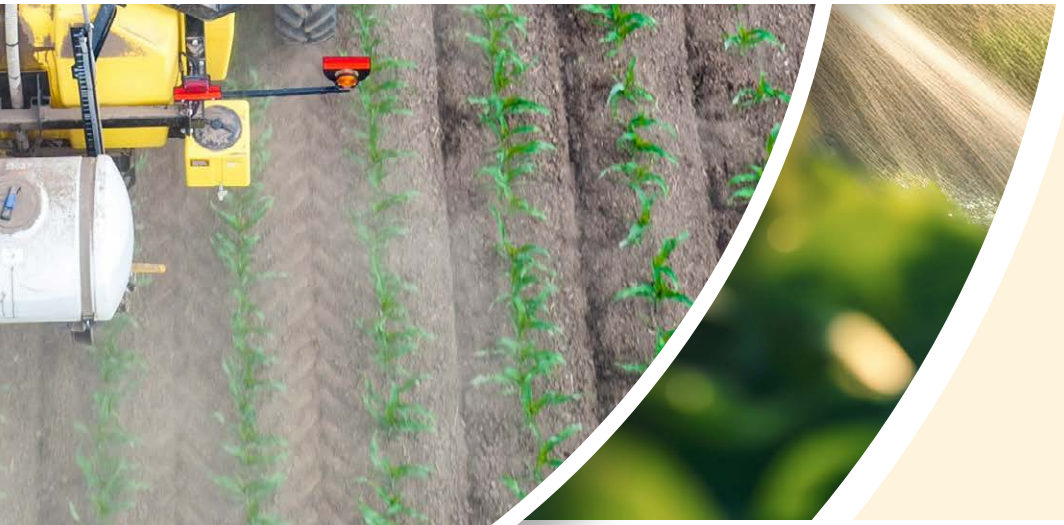
BRIEF SERIES | 13

Agrochemicals in Food Production and Processing



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SUMMARY

This brief on agrochemicals in food production and processing is aimed at identifying ways of transitioning African food systems (production and processing) to reduce their reliance on synthetic agrochemicals and promote inputs that protect human health and are environmentally friendly and sustainable. The main finding is that agrochemical use and misuse in African food production and processing are on the rise. The proliferation of these chemicals is largely due to: a) powerful agrochemical corporations prioritising profits over the adoption of environmentally friendly agroecological practices; b) weak regulatory environments in many African countries; c) commercial farmers promoting agrochemical use over agroecological practices; and d) poor awareness and education among farmers and other stakeholders on agrochemical use in food production and processing.

The main finding is that agrochemical use and misuse in African food production and processing are on the rise

To transition African food production and processing systems away from the burgeoning use of agrochemicals towards the increased use of environmentally friendly and agroecological inputs, this brief puts forward six recommendations:

- Strengthen agrochemical governance through inclusive multi-stakeholder participation and transparency across the entire food production and processing value chain, and across scales from local to national to international.
- Coordinate, mobilise and support investments into agroecological food production and processing systems and practices.
- Raise awareness of the deleterious effects of agrochemicals in food production and processing, and empower farmers on alternative production (e.g. bio-inputs such as biochar) and processing systems.
- Use finance-related levers that include tax relief and credit lines to reorient capital towards agroecological practices aimed at reducing the increases in synthetic agrochemicals in the food production and processing systems.
- Ensure that philanthropic and related organisations supporting agrochemical corporations insist on safer and ecologically friendly agrochemicals, including putting mechanisms in place to counter the rapid spread of these harmful agrochemicals in African food production and processing. Such mechanisms could include collaborating with government agencies to strengthen regulatory environments and technical capacities in agroecology, promote climate-resilient indigenous seeds and cultivars, support targeted education and awareness programmes and promote market access for agroecologically and organically produced as well as other environmentally safe processed food.
- Encourage philanthropic organisations to work closely with civil society organisations and grassroots movements, researchers and other role-players that are demanding safer and ecologically friendly agricultural practices. This would imply an adoption of a holistic and value-chain-wide approach to combating the use and expansion of agrochemicals in food production and processing. Such an approach would necessarily include banning the importation of highly hazardous chemicals and equipping farmers with the necessary knowledge to make informed decisions. Taking actions as well as working collaboratively across levels of society and among diverse actors and stakeholders is urgent.

INTRODUCTION

Agrochemicals are chemical products used in agriculture during the production and processing stages and may include chemical production inputs such as fertilisers and pesticides and processing inputs such as food additives (used to modify the colour, texture and taste of processed food as well as to extend food shelf life, among others). These chemicals include several classes of antifeedants, antibiotics, chemosterilants, hormones, mating disruptors, plant activators, food preservatives, plant growth regulators, fumigants, pesticides, synthetic fertilisers and seed coatings (Horak et al. 2021; Ravichandra 2018; Speight 2017). In many ways, the advent of agrochemicals in food production and processing has somewhat contributed to food security but at a great environmental and human health risk, which includes the death of non-target species and food poisoning (Horak at al. 2021).

This brief provides a strong motivation for the African food production and processing system to curtail the proliferation of harmful agrochemicals. It provides evidence of the deleterious ecological and human health risks of harmful agrochemical use and misuse in the food production and processing value chain. It also sheds light on the context-mediating factors promoting agrochemical use including African reliance on agrochemical donation, a growing human population, climate change and an increased demand for food. This brief articulates the potential role of large corporations, philanthropic organisations and governments in promoting harmful agrochemical use in the African food production and processing system.

Agrochemicals are chemical products used in agriculture during the production and processing stages and may include chemical production inputs such as fertilisers and pesticides

It also highlights key hurdles to transition in the African food production and processing system. These include curtaining the overwhelming influence of large capitalist corporations shaping the African food system narratives for their own economic gains, the continuing use of banned and toxic chemicals, powerful lobby groups of large farmers influencing the policy and regulatory environments for their own economic benefits, and a largely weak regulatory environment in many African countries. In addition, the influence of climate change and environmental degradation that have contributed to the increased use of agrochemicals in the food production and processing systems. Finally, key recommendations for transitioning.

MOTIVATION

Agrochemical use in Africa is on the rise due to the increased demand for food, a weak regulatory environment, climate change and environmental degradation. South Africa alone has over 3 000 registered pesticide products, accounting for 2–4% usage and 5% of the pesticide market on the continent (Demi & Sicchia 2021; Horak et al. 2021; Ndayambaje et al. 2019). Climate change contributes to the expansion of synthetic and harmful agrochemicals used in Africa due to changing soil fertility, drought and other climate-related factors (e.g. changing pollinator bio-geographical distribution). For example, prolonged warmer climates bring more pests, favour a diversity of weeds and impact soil water retention, soil fertility and the shelf life of processed food (Godde et al. 2021; Amare 2016).

These changing climate effects have led to the increased use of harmful agrochemicals such as fertilisers, pesticides and soil conditioners in the production system, and food preservatives in the processing system. Furthermore, empirical evidence indicates that the increased use of synthetic agrochemicals contributes to climate change, creating a vicious cycle (Food and Agriculture Organization of the United Nations (FAO) 2023; Pesticide Action Network 2023; Drugmand et al. 2022). As the African population continues to grow in the face of a changing climate, there is a need to advance ecologically sustainable alternatives to mitigate against the use and potential misuse of harmful agrochemicals in the food production and processing systems.

Disturbing reports are emerging of agrochemical use in food production and processing across Africa. In Nigeria for example, sodium tripolyphosphate, a dehydrating agent banned from use, has been reported in farmed shrimps (*Penaeus monodon*) harvested from the Ekpan River (Isibor et al. 2018). It is claimed that this chemical is used to preserve the farmed shrimps and to give them firmness across the market value chain (Isibor et al. 2018). In South Africa, the organochlorine pesticides (endosulfan and dichlorophenoxyacetic acid 2,4-D-Amine)) and chlorpyrifos that are largely implicated in several endocrine disruption activities have been reported in the food production system (Curchod et al. 2020; Farounbi & Ngqwala 2020; Buah-Kwofie et al. 2017; Arukwe et al. 2016; Archer & van Wyk 2015; Barnhoorn et al. 2015; Amdany et al. 2014; Barnhoorn et al. 2010; Du Preez et al. 2005). These studies are indicative of the adoption of agrochemical use in food production and processing in Africa.

The unsafe and poor handling of harmful agrochemicals pose significant human health risk. In Ghana for example, the Northern Presbyterian Agriculture Services reported the death of 15 farmers in connection with chemical poisoning in the Upper East Region, due to exposure and the poor handling of agrochemicals (Demi & Sicchia 2021). Similar poor agrochemical handling was also reported in Uganda (Demi & Sicchia 2021; Ndayambaje et al. 2019). The studies found that 99.5% of smallholder farmers in Uganda applied pesticides without using personal protective equipment, and 92.7% of the same study population was observed to mix chemicals with their bare hands (Demi & Sicchia 2021; Ndayambaje et al. 2019). Several deaths have been reported in Rwanda and Burundi, linked to similar unsafe use of agrochemicals (Okonya et al. 2019). These studies highlight not only the risk posed by agrochemical use but also the urgent importance of promoting ecologically friendly practices in food production and processing.

The expansion of harmful agrochemicals and their negative consequences in the food production and processing systems, coupled with the effects of climate change and a growing human population in Africa, call for the urgent adoption of ecologically friendly and safe practices. These practices include the adoption of agroecology principles such as the use of indigenous seeds and cultivars, organic manures and biochar. In promoting agroecological principles, African governments and philanthropic and related organisations should put mechanisms in place to counter the burgeoning use of these harmful chemical products. Such mechanisms could include strengthening the regulatory environments and technical capacities in agroecology, promoting climate-resilient indigenous seeds and cultivars, supporting targeted education and awareness programmes and promoting market access for agroecologically produced and processed food.

CONTEXT

Several contextually mediated factors, such as human population growth and climate change, promote the proliferation of agrochemical use in African food production and processing systems. Africa's population is one of the fastest growing globally and it has been projected to reach 2.5 billion people by 2025 (African Development Bank 2024). 21% of people in Africa face food insecurity (UNICEF 2023). As Africa's population increases, the number of people who are food insecure and malnourished will also increase (FAO et al. 2023). The growth in population and the need for food security have led to the widespread use of harmful agrochemicals in food production and processing in Africa.

Africa is one of the most vulnerable continents to climate change (FAO et al. 2023). Countries in Sub-Saharan Africa, those in the Greater Horn of Africa especially, and those in the Sahel region are particularly impacted by climate change (Ayanlade et al. 2022). These countries are already experiencing desertification, low agricultural productivity, increased undernourishment and general food insecurity (WMO 2020). For example, since 2012, undernourishment has increased by 45.6% in Sub-Saharan Africa (WMO 2020). If the current trajectories continue, climate-related extreme events such as drought, floods, fire, desertification and heat waves will further escalate the food crisis on the continent. The current climatic trajectories have thus contributed to the increasing use of synthetic and harmful agrochemical use in food production and processing in Africa. The growing applications of these chemicals in the face of a changing climate are intended to enhance agricultural productivity, preserve food and enhance food security. But as already noted, these have also contributed to devastating human and ecological health outcomes.

In the early 2000s the so-called 'African Green Revolution' took hold (Ewout 2014; Moyo et al. 2009; AGRA 2009). This revolution was promoted primarily by external powerful philanthropic organisations such as The Rockefeller Foundation and the Gates Foundation (ActionAid 2009). The primary objective of the green revolution was to lift Africa out of poverty and food insecurity. To this end, millions of dollars were invested into African agricultural and related food systems (Ewout 2014). For example, the two foundations launched the Alliance for a Green Revolution in Africa (AGRA) in 2006 with initial funding of US$150 million. Through AGRA, agricultural production inputs such as inorganic fertilisers were accelerated.

Studies have shown that poor knowledge and economic and financial resources are also contributing to the proliferation of harmful agrochemicals in food production and processing in Africa

The so-called externally led African Green Revolution was so influential that in 2006, 40 national governments in Africa pledged to lift tariffs and taxes on fertiliser imports (Daño 2007). To date, Africa still relies heavily on philanthropic donations and the import of agrochemicals. Some of these chemicals are toxic and have been banned in Europe and elsewhere and, in many cases, become obsolete (World Bank Group 2013). Obsolete agrochemicals such as fertilisers and pesticides pose significant environmental and human health risks.

Studies have shown that poor knowledge and economic and financial resources are also contributing to the escalation of harmful agrochemicals in food production and processing in Africa (Demi & Sicchia 2021). For example, the application of agrochemicals without the appropriate protection is widespread on the continent, largely due to poor knowledge and economic resources to procure the appropriate protective gadgets (Demi & Sicchia 2021). Most farmers in Africa are unable to afford sophisticated farm machinery and protective equipment. As a result, they often resort to manual and simple farm tools for the application of harmful agrochemicals in their farms (Demi & Sicchia 2021) (see Table 1). The use of such tools in applying harmful agrochemicals pose significant human and environmental health risks.

TABLE 1: COMMON NAMES AND USES OF SOME PESTICIDES ACROSS AFRICA

S/N	Common name	Some trade names of pesticides in the African market	Uses
1	Glyphosate	Roundup, Glycel, Wipeout, Clearweed, Bushfire, Forceup, Sarosate, Rhonasate, Delsate, Glyphosate, Touchdown forte	Systemic herbicide for general weed control before land preparation
2	Paraquat	Gramoxone, Bret-P, Paraforce, Weedoff, Weedcrusher, Dragon, Dizmaxone, Lasher, Miazone, Weedex, Ravage, etc.	For general weed control (by contact) in all crops
3	Atrazine	Atrazine, Delzine, Atrataf, Atraforce, Xtrazine	For the control of grass weeds in cereals
4	Butachlor	Butachlor, Butacrop, Butastar, Butacot, Butaclear, Risene, Teer, Butaforce, Cleweed	For the control of broadleaf and grass weeds in rice and some legume crops
5	Propanil	Propanil, Propacare, Propan, Rhonil, Orizo, Propaforce	For post-emergence weed control in rice
6	Pendimenthalin	Stomp, Pendilin	For pre-emergence weed control in rice, maize and some legume crops
7	Oxidiaxone	Ronstar, Riceforce, Unicrown	For pre-emergence weed control in rice
8	Alachlor	Lasso, Alachlor	For pre-emergence weed control in maize and some legume crops
9	2,4-D Amine	Aminoforce, Delmin-forte, 2,4-D-Amine, Select	For pre- and post-emergence control of broadleaf weeds
10	Lamdacyhalothrin	Karate, Laraforce, Attack, Karto, Zap	Systemic insecticide for many crops
11	Cypermethrin	Cypermethrin, Suraksha, Superthrin, Best, Cymbush, Cypercot	Contact insecticide for many crops
12	Dichlovos	Nuvan, Pestoff, Rhonclov, Dash, Smash, Delvap, Wonder, Shooter, Nopest, Clepest, DDforce, VIP	Contact insecticide for the control of insects in storage and in houses. It is combined with Actellic and used to protect grains in storage.
13	Mancozeb	Z-force, Hi-shield, Mancozeb, Mycotrin	Contact fungicide for disease control in many crops

Source: Ekeleme et al. (2008)

HURDLES TO TRANSITION

Many big and powerful corporations that are financed by philanthropic organisations are increasingly dominating the policies, financing and narratives surrounding food systems, particularly in Africa. These corporations tend to prioritise market interests and profits over food safety, human rights and environment rights.

As climate change intensifies, larger corporations involved in the agrochemical value chain will continue to receive support from philanthropic organisations to provide food for people in Africa. The growing influence of powerful corporations and the widespread use of harmful agrochemicals in the food production and processing systems largely undermine many United Nations Sustainable Development Goals (SDGs), particularly SGDs 1, 2, 3, 12, 13, 14 and 15. These factors are harming people and the environment and are widening inequalities. Of particular concern are human and animal health, the loss of biodiversity, impaired soil health, environmental pollution and degradation.

To achieve the vision of SDG 2 for instance, it is crucial to address power dynamics among critical actors within the agrochemical systems to ensure that the policies, financing and narratives on food production and processing systems prioritise the well-being of people and the planet over corporate profits.

The continued use and proliferation of banned chemical products suggest a gap between government policies, enforcement and implementation authorities on the one hand and agrochemical dealers and farmers on the other (Asouzu Johnson et al. 2019). However, many developing countries lack the technical expertise and the appropriate technology to regulate and test for harmful agrochemicals or contaminants in food, soils and water.

The weak agrochemical regulatory environments in many African countries is another critical hurdle to transition. As a result of weaknesses in these environments, agrochemicals that are considered highly hazardous are still being imported into Africa and widely used by farmers. This usually contributes to the proliferation of such toxic chemicals in the food production and processing systems.

The adoption of agroecological principles among large, commercial farmers in Africa remains low, and this also constitutes a critical hurdle to transition. Large commercial farmers and their associations are powerful lobby groups in countries where they are deeply rooted, such as in South Africa and Kenya (Poole & de Frece 2010). They are capable of influencing government policies on agrochemicals and agroecological adoption in ways that may compromise food security, prioritising profit over ecological and human health.

RECOMMENDATIONS TO PROMOTE TRANSITION

This brief recommends the following to promote the transition from agrochemicals to agroecology:

- Strengthen agrochemical governance through inclusive multi-stakeholder participation and transparency across the entire food production and processing system, and across scales from local to national to international.
- Coordinate, mobilise and support investments into agroecological food production and processing systems and practices.
- Strengthen education and awareness-raising on the deleterious effects of harmful agrochemicals in food production and processing, and empower farmers on alternative production (e.g. bio-inputs such as biochar) and processing systems.
- Use finance-related levers such as tax relief and credit lines to reorient capital towards agroecological practices that are aimed at reducing the proliferation of agrochemicals in the food production and processing systems.
- Ensure that philanthropic and related organisations supporting agrochemical corporations insist on safer and ecologically friendly agrochemicals, including putting mechanisms in place to counter the expansion of these harmful chemicals in African food production and processing. Such mechanisms could include collaborating with government agencies to strengthen regulatory environments and technical capacities in agroecology, promote climate-resilient indigenous seeds and cultivars, support targeted education and awareness programmes and promote market access for agroecologically produced and processed food.
- Encourage philanthropic organisations to work closely with and fund civil societies and grassroot movements, researchers and other role-players that are demanding safer and ecologically friendly agricultural practices. This would imply the adoption of a holistic and value-chain-wide approach to combating the use and proliferation of agrochemicals in food production and processing. Such an approach would necessarily include banning the importation of highly hazardous chemicals and equipping farmers with the necessary knowledge to make informed decisions. Taking actions and working collaboratively across levels of society and among diverse actors and stakeholders is urgent.

CASE STUDIES

The **Alliance for Food Sovereignty in Africa** (AFSA) has agroecology networks across Africa, with 30 active members. It forms a broad alliance of different civil society actors that are part of the struggle for food sovereignty and agroecology in Africa. Its members represent smallholder farmers, pastoralists, hunter-gatherers, indigenous peoples, faith-based institutions and environmentalists throughout Africa. The AFSA creates awareness of the risks of agrochemicals and promotes alternatives that promote food sovereignty.

The **African Centre for Biodiversity** (ACB) is a research and advocacy organisation working towards food sovereignty and agroecology in Africa, with a focus on biosafety, seed systems and agricultural biodiversity. The ACB is committed to dismantling inequalities and resisting corporate-industrial expansion in Africa's food and agriculture systems. Within networks of partner organisations, the ACB works towards building public awareness and capacity to respond to, and resist, the uptake and/or further expansion of first and now second genetic modification technologies, such as gene drives or genome editing, in Africa. The ACB raises awareness of the risks of agrochemicals and has produced a range of policy briefs and research reports on the topic.

The **Ukulima True** campaign, which is part of the Centre for Agriculture and Bioscience International PlantwisePlus programme in Kenya, is aimed at reducing the risk of pesticides to stakeholders in the food value chain. It also works to improve the safety of food and protect farmers and environmental health. The programme advances safer plant protection products such as biopesticides and biocontrol products, which are readily available and affordable to farmers.

The new **Financing Agrochemical Reduction and Management** programme, funded by the Global Environment Facility, aims to catalyse a framework for regulation and financial investment in the agriculture sector. Importantly, the initiative has been seen to eliminate the use of most harmful inputs to food production in the entire food value chain, reduce the use of harmful pesticides and plastics in agricultural production and encourage the adoption of low- and non-chemical alternatives (Green Policy Platform). Another is the bokashi bio-fertilizer and organic products used in growing export-targeted avocados from Kenya to Europe.

Zambia also has a trailblazing **bokashi bio-fertilizer initiative,** which has several benefits including establishing a synergistic partnership between farmers, traditional leaders and like-minded organisations. This goes to show that transition can only take place through the will of the people, governments and good partnerships, as well as the support of philanthropies.

The successful passage of **presidentially assented bills on food safety and agrochemical monitoring** in Nigeria, targeted at safeguarding the environmental and human health of the people, is seen as a step in the right direction and a good case study of policy interventions.

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