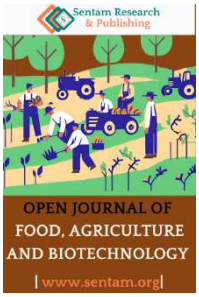
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# Seeds of Control: Corporate Power and the Battle for Food Sovereignty in Africa

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## ABSTRACT

This paper examines the escalating crisis of seed and food sovereignty in Africa, interrogating whether multinational corporations' increasing control over seed supply represents genuine concern for food security or constitutes a sophisticated mechanism of economic and political domination. Through critical analysis of corporate consolidation, intellectual property regimes, and philanthropic interventions particularly the Alliance for a Green Revolution in Africa (AGRA) supported by the Gates Foundation this study reveals how neoliberal agricultural policies systematically undermine farmer autonomy and indigenous seed systems. Drawing on comparative perspectives from India, Japan, and the United States, the paper demonstrates that the rhetoric of food security often masks corporate interests in profit maximization through seed patents, genetic modification technologies, and chemical input dependencies. Evidence from case studies across Kenya, Malawi, and other African nations illustrates how farmer-managed seed systems, which have sustained agrobiodiversity and climate resilience for millennia, face criminalization and displacement by formal seed regimes. The analysis concludes that true food security requires reclaiming seed sovereignty through biocultural rights-based approaches, supporting farmer-led innovation, and resisting the corporate enclosure of agricultural commons.

## INTRODUCTION

The control of seeds represents the control of life itself, and consequently, the control of humanity's most fundamental need, food. As the proverb suggests, those who control the food supply control the people, making seed governance one of the most critical battlegrounds in contemporary global politics. In Africa, where approximately 60-80 percent of seeds used by farmers have traditionally come from farmer-saved and exchanged varieties (Kerr, 2013), a system that is currently under threat. Multinational agrochemical corporations, supported by international development agencies and

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philanthropic foundations, are systematically restructuring African agricultural systems under the ostensible banner of food security (Maundu, 2025; Omondi, 2025). However, mounting evidence suggests this restructuring serves less to feed the hungry than to enclose the agricultural commons, commodify seed systems, and establish corporate dependencies that extract wealth from the world's poorest farmers.

The concept of food sovereignty, first articulated by La Via Campesina at the 1996 World Food Summit, emerged as a direct challenge to corporate-controlled food systems (Pimbert, 2009). Food sovereignty is defined as the right of peoples to healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems (Pimbert, 2022). This framework explicitly positions those who produce, distribute, and consume food at the heart of food systems, rather than the demands of markets and corporations. Critically, food sovereignty includes seed sovereignty denoted by farmers' rights to save, breed, exchange, and sell seeds, and to have access to diverse, open-source seeds that are not patented, genetically modified, owned, or controlled by emerging seed giants (AFSA, 2023; Campbell & Veteto, 2015; Shiva, 2012).

The urgency of this issue intensifies as we witness unprecedented seed consolidation. Since 1995, when the UN organized the Plant Genetic Resources Conference in Leipzig, 75 percent of all agricultural biodiversity has disappeared due to the introduction of 'modern' varieties cultivated as monocultures (Campbell & Veteto, 2015; Shiva, 2012)(Shiva, 2012). The Trade-Related Intellectual Property Rights Agreement (TRIPS) of the World Trade Organization has accelerated the spread of genetically engineered seeds, which can be patented and for which royalties can be collected. Currently, the top three seed firms control 85 percent of transgenic corn patents and 70 percent of non-corn transgenic plant patents in the United States (Campbell & Veteto, 2015). Despite the Global South being the locus of the majority of the world's agricultural biodiversity, the seed industry is dominated by firms from North America and Europe that utilize intellectual property protections to exploit this wealth.

This paper critically examines whether the increasing trend to control seed supply in Africa represents genuine concern for food security or constitutes another control mechanism launched by multi-conglomerate companies disguised as food security and philanthropy. Through comparative analysis with seed sovereignty struggles in India, Japan, and the United States, this study interrogates the political economy of seeds, the role of corporate philanthropy, and the resistance mounted by farmer movements defending their ancestral rights to seeds and food systems.

## Historical Context: From Commons to Commodities

### *The Traditional Seed Commons*

For thousands of years of human agriculture, the intrinsic nature of seeds from their capacity to reproduce themselves, prevented them from being easily commodified. Seeds were grown and resown by farmers, freely exchanged and shared (Guimarães & Paq, 2019; Nishikawa, 2022; Shield, 2021). Traditional farmers and their predecessors developed seed stock through *in situ* and *in vivo* farmer-breeding, working their fields and adjoining wildlands, selecting unique individuals and replanting seeds for consecutive years to isolate and develop new varieties (Campbell & Veteto, 2015; Maundu, 2025; Swiderska & Argumedo, 2022). This farmer-breeder process remains integral to human subsistence, as pockets of farmer-breeders persist in indigenous communities in the Global South and on marginal lands throughout the Global North.

In Africa, seed systems have historically been guided by indigenous core values of sharing and reciprocity, and balance with nature (Swiderska & Argumedo, 2022). These customary principles are common features across indigenous cultures from the Quechua of Peru to the

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Mijikenda of coastal Kenya. The obligation to share seeds and related traditional knowledge enhances the diversity of seed each farmer holds, helps maintain seed purity, and promotes further diversification through adaptation to different environments. Women play a key role in managing these seed systems and transmitting knowledge to younger generations. In Cusco's Potato Park, for instance, indigenous practices of saving and sharing seeds to spread risk are embedded in traditional networks that connect farmers across different environments, ensuring food security despite significant climate change impacts (Swiderska & Argumedo, 2022).

### *Colonial Disruptions and Post-Colonial Continuities*

The trajectory toward contemporary seed consolidation began with colonial processes that reduced smallholder land availability, increased migration, reduced time available for farming, and at times coerced production in particular crops while promoting a scientific bias against local varieties of seeds appropriate for smallholder farmer conditions (Kerr, 2013). In Malawi, for example, colonial rules and the post-colonial Banda regime favoured estate production and fostered a dual pattern of agriculture which privileged export crops and hybrid maize over smallholder indigenous crops (Kerr, 2013; Kerr et al., 2019; Samoei et al., 2025). Structural adjustment policies subsequently removed the few supports made available to smallholder farmers and opened the seed system up to foreign control, while reducing public funding for agricultural research, thereby placing the formal seed sector firmly into multinational corporations' control.

The emergence of the hybrid seed-corn industry in the 1930s marked a turning point in seed commodification. Hybridization alone did not warrant industry investment in seed companies; rather, it was the enforcement of patent-like protections that attracted the entrance of chemical and oil companies to add seeds to their portfolio of agricultural inputs (Campbell & Veteto, 2015). When agrichemical corporations released transgenic seeds with full patent protection in the 1990s, a competition ensued whereby they absorbed as many small family-owned seed companies as possible. This consolidation accelerated dramatically following international trade agreements, particularly the WTO's TRIPS Agreement, which virtually ensures that only a handful of corporations control the majority of the industrial food supply.

## THE ARCHITECTURE OF CORPORATE CONTROL

### Seed Market Consolidation and Monopoly Power

Today, control of the food supply is no longer primarily about land or armies but about multinational agribusinesses (Ahmed, 2025). Companies like Monsanto (now part of Bayer), Syngenta, and Cargill wield immense influence through patents on genetically modified seeds, control over fertilizer production, and global grain distribution. These corporations effectively shape what the world eats and who gets to eat it. DuPont, Monsanto, Syngenta, and Limagrain currently control 29 percent of the world market in seeds, with Monsanto controlling almost all genetically engineered seed (Ahmed, 2025; ETC Group & GRAIN, 2025; Tandon, 2011). More than half of the global seed market is now in the hands of just a few corporations (Shield, 2021).

The pattern of consolidation is striking. Multinational agrochemical corporations purchase and patent extant seed sources and make them unviable without chemical applications, thereby ensuring that farmers must buy seeds and inputs from them annually (Campbell & Veteto, 2015). Monsanto and other agribusinesses have filed over 500 patent documents for 'climate-ready' genetic material, positioning themselves to capitalize on climate change anxieties while deepening farmer dependencies (Kerr, 2013; Kerr et al., 2019). This vertical integration, whereby one corporation owns each step in the food system from production through packaging and distribution, including monopoly seed control

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which creates profound instability and vulnerability in global food systems.

## Intellectual Property Rights as Enclosure Mechanisms

Seed patents and intellectual property rights serve as powerful mechanisms of control and dispossession. Through TRIPS and the International Union for the Protection of New Varieties of Plants (UPOV) Convention 1991, farmers cannot legally save and replant seeds from genetically modified crops, creating dependence on corporations every planting season, a cycle of economic control disguised as innovation (Ahmed, 2025; APBREBES, 2024). Countries including the United States, Canada, Switzerland, Japan, and European Union member states use bilateral and regional trade agreements to pressure countries in the Global South, such as Zimbabwe and India, to join UPOV (Ahmed, 2025; APBREBES, 2024; Shield, 2021).

The Royal Society's report 'Reaping the Benefits' acknowledges that while patents have stimulated commercial development in some instances, intellectual property restrictions have major impacts on access to new technologies, especially for the poor, potentially restricting farmers' options and forcing those with no other options into restrictive and expensive commercial relationships (Tandon, 2011; The Royal Society, 2009). African regional intellectual property organizations representing several countries have adopted Plant Variety Protection protocols modelled on European UPOV standards, posing serious threats to farmers' rights and seed systems by limiting possibilities for farmers to use, exchange, and trade farm-saved seed of protected varieties (Swiderska & Argumedo, 2022).

Monsanto's aggressive patenting practices have monopolized control over seeds in ways that deny farmers control over their own harvest, with the corporation suing and bankrupting farmers for 'patent infringement' (APBREBES, 2024; Tandon, 2011). As one Monsanto representative stated regarding their role in drafting TRIPS: 'In drafting these agreements, we were the patient, diagnostician and physician all in one' (Shiva, 2012). Corporations defined the problem, farmers saving seeds, and offered the solution: making it illegal for farmers to save seed by introducing patents and intellectual property rights.

## Philanthrocapitalism and the AGRA Agenda

### *The Gates Foundation and the New Green Revolution*

The Alliance for a Green Revolution in Africa (AGRA), established through partnership between the Gates and Rockefeller foundations, represents a major assault on Africa's seed sovereignty (Shiva, 2012). With investments exceeding $150 million, AGRA describes itself as 'a dynamic partnership working across the continent to help millions of small-scale farmers and their families lift themselves out of poverty and hunger' (AGRA, 2023; Tandon, 2011). However, critics argue that AGRA's structure and operations closely resemble Monsanto's business model, creating pathways for corporate control of African agriculture from laboratory to village farm.

The institutional links between the Gates Foundation, Monsanto Corporation, and AGRA are extensive and troubling. Rob Horsch, Vice President for International Development at Monsanto for 25 years, served as a senior program officer for the Gates Foundation (Nemecek, 2006; Tandon, 2011) A 2010 Wall Street Journal report revealed that Monsanto was among the Foundation's portfolio investments, representing 500,000 shares valued at $27.6 million. This financial entanglement raises serious questions about whose interests AGRA truly serves. According to environmental attorney Mariam Mayet, director of the African Centre for Biosafety, 'When the economic power of Gates is coupled with the irresponsibility of Monsanto, the outlook for African smallholders is not very promising' (Tandon, 2011).

The way the Gates and Rockefeller foundations have set up AGRA resembles Monsanto's

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operational format. AGRA purports to finance and train small and medium-sized agro-chemical dealerships up to the village level to ensure 'improved seeds' have a smooth channel to flow to all farmers across the continent (Tandon, 2010, 2011). However, Monsanto must police its technology contracts, meaning transfer from Monsanto's laboratories to farmers is best controlled if the financier maintains oversight of the seed supply chain in Africa. This leads to corporate control of seed supply from lab to village farm, whether or not seeds are genetically engineered.

### *The Lugar-Casey Act and Mandated Genetic Modification*

In March 2009, the US Senate Foreign Relations Committee passed the Global Food Security Act (also known as the Lugar-Casey Act), legislation that for the first time mandates the use of genetic modification technologies in food aid policy (Tandon, 2011). The act directs $7.7 billion worth of agricultural development funding largely toward genetically modified crop research. This represents the biggest project in agriculture since the original Green Revolution of the 1950s and 1960s, a revolution that, despite increasing global food production by 11 percent, also saw per capita hunger increase equally (Tandon, 2011).

The Lugar-Casey Act suffers from all the same problems as the first Green Revolution. Green Revolution technologies are expensive, the fertilizers, seeds, pesticides, and machinery needed to achieve productive gains put the technology out of reach of most small farmers, increasing the divide between rich and poor in the developing world and driving poor farmers out of business and into poverty-stricken urban slums (Chakwanda et al., 2024; Tandon, 2011). This time, however, the genetically engineered seeds are under patent and privately owned by biotechnology corporations that monopolize the seed industry, meaning farmers must buy new seed each year (Tandon, 2011).

Research and development investments of millions of dollars flow into engineered climate-smart seeds as solutions to food security under climate stress. Yet when Monsanto's genetically modified maize failed to produce kernels in South Africa in 2009, hundreds of farmers were devastated, with some suffering up to 80 percent crop failure (Eralleigh, 2019; Stuijt, 2009; Swanby & Mayet, 2013; Tandon, 2011). While Monsanto compensated large-scale farmers to whom it directly sold seed, it gave nothing to numerous small-scale farmers who had received free sachets. Such failures demonstrate the risks of dependence on corporate seed technologies marketed as solutions to climate and food crises.

## COMPARATIVE PERSPECTIVES: GLOBAL DIMENSIONS OF SEED SOVEREIGNTY STRUGGLES

### India: Resistance and Farmer Suicides

India provides a sobering case study of corporate seed control's devastating consequences. The country was forced to allow patents on seeds through the first dispute brought by the United States against India in the WTO (Shiva, 2012). Since 2004, India has attempted to introduce a Seed Act that would require farmers to register their own seeds and obtain licenses, effectively forcing farmers from using their indigenous seed varieties. Through Seed Satyagraha a non-cooperation movement in Gandhi's footsteps and working with parliament, activists have thus far prevented the Seed Law from being introduced (GRAIN, 2005; Srivastava, 2006).

India has also signed a US-India Knowledge Initiative in Agriculture with Monsanto on the Board, and individual states face pressure to sign agreements with Monsanto (Shiva, 2012). The consequences have been catastrophic. As Shiva (2012) documents, farmer suicide rates have spiked dramatically in India, particularly in regions where BT cotton has been promoted. Farmers trapped in debt cycles created by expensive seeds and required chemical inputs, facing crop failures and unable to save seeds for

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replanting, have found themselves in impossible economic situations. This represents not merely market failure but a profound human rights crisis rooted in the destruction of seed sovereignty.

In 1996, 200,000 farmers in India protested the patenting of seeds by multinational corporations (Patel, 2012). Such massive mobilizations demonstrate farmers' understanding that seed control represents an existential threat to their livelihoods and autonomy. The struggle for food sovereignty in India explicitly connects to the human right to eat, which is deeply connected to rights to land, water, and seeds (Mencher, 2013).

## Japan: Diversity in Seed Governance

Japan offers a different perspective on seed sovereignty, demonstrating that plural approaches to seed governance can coexist. Using qualitative case study approaches, researchers have tracked diverse seed governance and sharing systems across traditional, organic, and lifestyle farmers and local community members (Kawai, 2022). These groups demonstrate differences in how seeds are valued culturally, economically, through rights-based frameworks, familial, or personally which influence approaches to saving and sharing seeds.

Importantly, not all people who procure and supply seeds in Japan and other Asian countries base their farming practice or activities on specific rights to use and control resources (Nishikawa, 2022). Their approaches and practices derive not from politics but from intuitive understanding, as farmers, of their role in stewarding regional ecology. This process expresses endogenous development and provides the foundation of their approach to seed care. For many, there is no contradiction between concepts of property rights and informal, day-to-day applications of traditional tacit knowledge on seeds, the two can exist in parallel.

This raises important questions about imposing sovereignty-based frameworks on communities that have managed resources without such thinking. While food sovereignty movements promote traditional farming, organic farming, and small and medium-sized family farming in places as different as the United States, Japan, France, India, Southeast Asia, and most of Africa (Mencher, 2013; Nishikawa, 2022), introducing concepts of seed sovereignty to seed governance where people have emphasized commitment and care rather than rights-based thinking may risk generating new forms of oppression or pressuring people to accept political perspectives of sovereignty as necessary discourse (Nishikawa, 2022).

## United States: Corporate Consolidation and Grassroots Resistance

In the United States, despite record production of crops subsidized by the federal government, approximately 15 percent of households experience food insecurity (Campbell & Veteto, 2015). The conventional food system engages in profoundly unsustainable practices: over-reliance on non-renewable fossil fuels and irrigation water, over-application of biocides that poison drinking water and destroy natural soil fertility, dependence on monoculture production of a small number of crop varieties, and long-distance food travel all of which make the system volatile and precarious. US settlements and communities maintain approximately three to five days' worth of total food for local populations; if transportation halts, chaos would likely ensue.

Conventional strategies to ameliorate food insecurity place band-aids on gaping wounds and do little to resolve fundamental problems stemming from increasingly concentrated control of the food supply (Campbell & Veteto, 2015; Rubin, 2022; Wittman, 2023). Volunteer food bank systems and food stamp programs distribute industrial food to the hungry, but both strategies facilitate dependency and encourage diets that contribute to obesity and diabetes. The number of small farms in the United States was decreasing until about six or seven years ago, but has recently started increasing as more people turn to growing their own food either along with other paid work or as their only occupation (Guimarães & Paq, 2019; Mencher, 2013; Patel, 2012).

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Grassroots movements in the United States have emerged to challenge corporate seed control and promote agrobiodiversity conservation. Several projects focus on conserving agricultural biodiversity and restoring control over open-pollinated seeds within specific communities, particularly in the Ozark Highlands and Appalachian Mountains (Campbell & Veteto, 2015). These movements recognize that if we no longer have farmer-breeders managing and developing open-pollinated landrace varieties, no source for new germplasm exists, a critical concern as weed species, pests, diseases, and extreme droughts ravage industrial monocultures.

## AFRICAN REALITIES: FARMER-MANAGED SEED SYSTEMS UNDER SIEGE

### The Resilience of Traditional Seed Systems

Eight case studies conducted across seven African countries (Togo, Tunisia, Zimbabwe, Senegal, Cameroon, Burkina Faso, and Gabon) conclusively demonstrate the extent to which it is possible and viable for family farms in Africa to take control of agricultural seed systems and, consequently, of their food sovereignty (AFSA, 2023). These interventions provide insight into how seed sovereignty can be achieved using local African knowledge systems, supported by other scientific knowledge where necessary, invalidating the tendency to subjugate or despise African knowledge systems.

Using simple technologies that are easily accessible locally, it is possible and viable to multiply and produce various types and varieties of seed indigenous to Africa and to domesticate those of exogenous origin (AFSA, 2023; Dena, 2025; Samoei et al., 2025). Communities have multiplied and used for food production seeds including soya, durum wheat, maize, sorghum, cowpea, turmeric, fennel, dill, coriander, and dozens of other varieties. The case studies demonstrate how resilient African systems of knowledge about post-harvest treatment are, with appropriate technologies for household seed saving such as using sand and ash for preservation and traditional granaries made from locally available materials for storage.

Communities using these farmer-managed seed systems report improved quality of life, greater autonomy, and self-sufficiency in terms of access to seeds at the right time and at lower cost (AFSA, 2023; Maundu, 2025; Tandon, 2011). The seeds have proved more resistant and better adapted to local climatic conditions, increasing production volumes while guaranteeing seeds for the next planting. Benefits are twofold: lower seed purchase costs and higher production volumes for their own consumption and income generation. Because farmers work as groups, they gain total control over their food system and strengthen their social capital and dignity.

Farmer-saved seed has been found to be more resistant to climatic hazards, as organic farmers' seed is well adapted to local climate, having been produced under very local climatic conditions (AFSA, 2023; Behl et al., 2025; Kansiime & Mastenbroek, 2016). As one farmer explained, it is like a mother who breastfeeds exclusively, her child will be more resistant to disease than a child fed a mixed diet. This is what seeds from farmer-managed seed systems are like. Farmers' seed systems have proved very important during COVID-19; when travel restrictions compromised access to and availability of inputs including commercial seed, farmers who had saved their own seeds did not struggle.

### Legal Battles and Criminalization of Farmer Practices

For years, Kenyan farmers lived under the shadow of a law that threatened jail terms of up to two years and fines of 1 million shillings (approximately $7,800 USD) for selling or exchanging unregistered seeds, effectively handing control of the country's food system to multinational corporations (Levy, 2025; Maundu, 2025; Omondi, 2025). In a decisive victory for food sovereignty and climate justice in November 2025, the High Court of Kenya ruled in favour of smallholder farmers, declaring punitive sections of the Seed and Plant Varieties

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Act unconstitutional. The judgment effectively decriminalized the age-old practice of saving, sharing, and exchanging indigenous seeds, affirming that Farmer-Managed Seed Systems (FMSS) are a protected right, not a criminal activity.

This landmark judgment establishes powerful legal precedent globally, affirming that the ancient right of farmers to save and share seeds supersedes commercial interests, reshaping the legal balance of power between communities and agribusiness worldwide (Levy, 2025; Maundu, 2025; Omondi, 2025). Samuel Wathome, a smallholder farmer who was the first petitioner in the case, stated: 'I have waited years to hear these words. My grandmother saved seeds, and today the court has said I can do the same for my grandchildren without fear of police or prison. Today, the farmer is king again.'

This legal victory represents resistance against what critics call 'neocolonial agriculture.' Imposing uniform rules on a global scale ultimately means forcing industrial farming that dominates Europe and the US onto parts of the world where food is still largely produced by smaller-scale, more sustainable farms (Ahmed, 2025; Shield, 2021; War on Want, 2021). As Mariam Mayet, director of the African Centre for Biodiversity in South Africa, argues: 'We're looking at this as neocolonialism destroying our livelihoods and our environment' (AFSA, 2023). Switching to standardized seeds changes whole agricultural systems, as the big four agribusinesses also produce fertilizers and pesticides that farmers must buy to ensure their yield, dictating field layouts, affecting species survival, and altering soil nutrient composition.

## Malawi: A Case Study in Seed System Transformation

Malawi provides a detailed case study of how seed sovereignty has been systematically eroded through historical processes, structural adjustment, and contemporary corporate interventions. Historical processes shaped seed sovereignty for smallholder farmers in contemporary Malawi, where farmers found their seed choices increasingly dictated by external forces (Kerr, 2013; Kerr et al., 2019). The Mutharika regime's increased promotion of hybrid varieties through input subsidies, alongside other economic and political ruptures, made farmers less able to save, plant, and maintain landrace and open-pollinated variety (OPV) seeds (Kerr, 2013; Walls et al., 2023).

As a retired Malawian maize breeder explained in 2004:

> *The National Seed Company was sold to Cargill... Now there are new owners with Monsanto, of course it is an American company but for Monsanto Malawi there are new owners. There is also Pannar, Pioneer, Seed Co. These are all foreign companies... The farmers are now getting free seed but... this money will go. At first the grain was subsidized, then the fertilizer, then the seed. But this is not sustainable* (Kerr, 2013).

The breeder noted that the government has a catalogue of released varieties, including many OPVs, that simply sit on shelves unused.

Elsewhere in sub-Saharan Africa, Monsanto promotes Roundup Ready GM crops as a means to reduce labour requirements for HIV-infected households, despite the fact that HIV-affected rural households are often poor and cannot afford the herbicides and seeds (Kerr, 2013; Kerr et al., 2019; Walls et al., 2023). Monsanto also promotes seeds and herbicides in Malawi under the rubric of 'conservation agriculture,' in concert with the Ministry of Agriculture and non-governmental organizations such as Sasakawa. This technology, involving using more herbicides to replace tillage, has in other countries led to greater uptake of herbicide-tolerant crops and, over time, increases in herbicide-resistant weeds.

The example of 700 metric tons of hybrid maize seed donated by Monsanto for free distribution in Malawi through Sasakawa and the Ministry of Agriculture highlights the blurry lines between charity and profit that slowly erode seed sovereignty for farmers (Kerr et al., 2019, 2019; Walls et al., 2023). Given that seed companies,

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and in particular transgenic seed production, are highly concentrated in a handful of large multinational corporations, the potential for eroding farmer seed sovereignty is high. Importantly, reliance on GM crops means annual purchase of inputs and increased herbicide and fertilizer use tied to these seed types, increasing the likelihood of farmers getting trapped in an input-credit dependent cycle and increasing the likelihood of failure and greater marginalization of poorer farmers.

## Climate Resilience Paradox: Indigenous Systems vs. Corporate Solutions

### *Agrobiodiversity as Climate Adaptation*

Indigenous seed systems have domesticated, conserved, and improved much of the world's genetic diversity, adapting seeds to changing environmental conditions through knowledge and cultural values, ensuring food security and biodiversity conservation for millennia (Swiderska & Argumedo, 2022). Their seed systems are at the forefront of genetic evolution and adaptation to climate change, sustaining crop wild relatives (CWRs) that are the first to develop resilient properties and actively harnessing these properties to enrich domesticated crops. Safeguarding this genetic diversity is crucial for global food security, particularly given increasing homogenization of agri-food systems and growing climatic extremes and unpredictability. Genetic diversity is crucial for indigenous peoples' own food security to reduce the risk of crop failure and ensure stable production, dietary diversity, and nutrition. Perhaps even more importantly, it is a key source of cultural identity, pride, social cohesion, and spiritual wellbeing (Petersen, 2014; Swiderska & Argumedo, 2022; Wittman, 2023). The COVID-19 pandemic demonstrated the critical importance of indigenous seed and knowledge systems for resilience to shocks they proved far more resilient than those based on Western science and global markets.

Traditionally, farmers have grown and saved a range of seed varieties to spread risk and guarantee a harvest (Petersen, 2014; Pimbert, 2022; Tamura, 2022). High-yielding varieties being bred and sold through a few corporations may not perform as well in the face of unpredictable rains and temperatures, floods and droughts, making farmers, communities, and the entire global food system highly vulnerable to climate change. Great seed diversity and local knowledge about crops constitute vital tools for resilience toward these challenges. Diversity of plant resources helps farmers respond to threats climate change creates for agriculture, while monoculture production increases vulnerability.

### *Corporate Climate-Smart Seeds: Solution or Deepening Dependency?*

Monsanto and other agricultural corporations have begun investing heavily in developing drought-tolerant genetic material, investing $1.5 billion in collaboration with BASF in breeding drought-tolerant crops, and collaborating with the Gates Foundation, CGIAR international agricultural research system, and the African Agricultural Technology Foundation to develop GM drought-tolerant maize (AGRA, 2023; Kerr et al., 2019). Monsanto, BASF, Syngenta, and other agribusinesses have filed over 500 patent documents for 'climate-ready' genetic material. All these efforts point to increased corporate control over the types of seeds that farmers will plant in Malawi and elsewhere in the Global South, through commodification over seeds' genetic makeup and genetic manipulation impossible for farmers to undertake on their own.

Seed sovereignty is further eroded through the potential for GM maize to introgress into genomes of local varieties, resulting in other yet unknown seed traits, the possibility of increased weed and pest resistance, and increasing potential corporate claims over these seeds (Kerr, 2013; Kerr et al., 2019; Nyéléni, 2022). Promotion of GM crops is embedded in a competing dominant discourse about GM crops as one of the best ways to address food security for the poor in the face of climate change, linked to millions of dollars of funding. However, this discourse obscures the reality that corporate 'climate-smart' seeds create new

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dependencies rather than building on proven resilience of farmer-managed systems.

A 2009 report recommended that 'international agricultural research projects with substantial payoffs for a large number of beneficiaries should be given investment priority, particularly genetically modified organisms (GMOs) that offer major potential for boosting agricultural yields and climate proofing crops' (Tandon, 2010, 2011). Yet at some point, there must be a return on investment in Argentina, Monsanto claimed this back retroactively. The number of farmers using GM crops worldwide increased by 1.3 million from 1996 to 13.3 million, with the number of countries growing these crops increasing from six in 1996 to 25 in 2008. More than 90 percent of farmers using GM crops in developing countries are small and resource-poor, making them particularly vulnerable to the dependencies these technologies create.

## RESISTANCE, ALTERNATIVES, AND THE PATH TO FOOD SOVEREIGNTY

### Farmer Movements and the Politics of Food Sovereignty

La Via Campesina, an organization of farmers, peasants, and landless workers' movements with over 150 million combined members in 70 countries, has led the global struggle for food sovereignty since its first meeting in 1993 (Patel, 2012). By 1996, at the World Food Summit where the most recent definition of food security was written, La Via Campesina codified its vision for an alternative food system under the rubric of 'food sovereignty.' The organization's member movements have undertaken a range of actions to confront what they see as inequality in power within the food system. In Brazil, hundreds of thousands of people occupied farmland upon which they built thriving communities. In Europe, 30,000 farmers marched on Brussels to offer an alternative policy goal to food security achievement (Patel, 2012).

Food sovereignty has been discussed and defended under the leadership of La Via Campesina over the past two decades (Pimbert, 2022; Tamura, 2022). Other social movements have also contributed to shaping the agenda around this issue. Most notably, indigenous peoples have expanded the food sovereignty paradigm to include sacred and spiritual dimensions of life. Members of the Indigenous Circle during Food Secure Canada's People's Food Policy process broadened the food sovereignty framework by emphasizing: 'Food is sacred, food is a gift of life, not to be squandered. It cannot be commodified' (Pimbert, 2022).

A central demand in La Via Campesina's call for food sovereignty is for the WTO to 'get out of agriculture,' meaning not only that the Agreement on Agriculture within the WTO should be nullified, but that a range of other WTO provisions affecting agriculture, such as rules on intellectual property rights on seeds and phytosanitary measures, should also be suspended (Patel, 2012). Trade agreement rules are influenced by the corporations that subsequently benefit from them, with demonstrated gendered impacts as a result. At a 2009 La Via Campesina meeting, one of the slogans offered by the assembly was that 'food sovereignty is an end to all forms of violence against women,' recognizing how corporate food systems disproportionately harm women.

### Agroecology and Farmer-Led Innovation

Traditional agroecology, where farmers grow food in diverse ways that mimic and adapt to local ecologies, provides a template for food security and sustainability because it creates resiliency and protection against crop failure (Campbell & Veteto, 2015; Kerr et al., 2019; Nishikawa, 2022; Pimbert, 2022). Traditional farming populations have always managed fields and adjacent wildlands through methods that maintain, conserve, and even enhance biodiversity. In marginal landscapes worldwide, subsistence farmers maintain suites of cultural adaptation that include their agroecological knowledge, technology, and plant genetics that provide enhanced adaptability and efficiency in their respective locales.

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At the national level, many governments now include criteria for agroecological certification in agricultural legislation and promote principles of agroecology outlined by the FAO in agricultural outreach and extension programs (Wittman, 2023). Agroecological transitions involve implementation of context-specific practices to support cropping systems that reduce their use of external inputs such as synthetic fertilizers and pesticides. Diversified farms those that include multiple kinds of land uses such as integration of crops and livestock, crop rotations and intercropping, and agroforestry systems have been shown to increase productivity by using ecological principles of nutrient recycling (Kawai, 2022; Kerr et al., 2019).

Research has shown that smaller farms, which tend to be more diversified to meet both subsistence and local market conditions, demonstrate higher yields and greater crop and non-crop biodiversity at both farm and landscape scales (Wittman, 2023). Diversified and agroecological farming systems have also shown greater climate resilience, defined as a set of integrated social and ecological processes and outcomes that enhance adaptive capacity, augment mitigation potential, and reduce vulnerability of farming systems. In the Philippines, a polycentric food sovereignty network including small-scale farmers movements, scientists, and NGOs has built a framework for climate resilience by addressing root causes of vulnerability unequal access to seeds, land, and knowledge.

## Biocultural Rights and Indigenous Seed Governance

The integrity of seeds as biocultural heritage is best protected through a biocultural rights-based approach to seed governance (Swiderska & Argumedo, 2022). Biocultural rights are a community's long-established right, in accordance with its customary laws, to steward its lands, waters, and resources. They are not simply claims to property but the collective rights of communities to carry out traditional stewardship roles as conceived of by indigenous ontologies. An approach based on these rights goes beyond the concepts of food or seed sovereignty by explicitly recognizing the cultural and spiritual nature of indigenous seed governance.

Increasingly, biocultural rights are being recognized in international environmental law. Recognizing these rights in national and international law means recognizing concepts like biocultural heritage and protecting customary legal systems. In indigenous cultures, biocultural rights include the rights of Mother Earth, rivers or lakes which have been formally recognized in a few cases and the rights of seeds (Nyéléni, 2022; Petersen, 2014; Swiderska & Argumedo, 2022). Protecting indigenous seed systems and implementing a biocultural rights-based approach demands reforming national seed policies to remove threats to indigenous seed systems and promote mutually supportive formal and informal seed systems.

The Potato Park in Cusco, Peru, demonstrates the viability of this approach. Through their Inter-Community Agreement, five Quechua communities recognize collective custodianship over indigenous knowledge and seeds, with everyone having the right to freely access knowledge (barring sacred knowledge) and seeds, and the obligation to maintain their free flow among Potato Park and neighbouring communities and to transmit them to future generations (Swiderska & Argumedo, 2022). The agreement helped restore seed diversity as well as associated indigenous knowledge and beliefs embedded in seeds, enhancing food security, resilience to climate change, and livelihoods while protecting communities' rights over their native potato varieties and ancestral knowledge.

# CONCLUSION

The evidence overwhelmingly demonstrates that the increasing trend to control seed supply in Africa represents not genuine concern for food security but rather a sophisticated mechanism of corporate control disguised as food security and philanthropy. Multinational corporations, operating through complex networks involving philanthropic foundations, international

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development agencies, and compliant governments, are systematically restructuring African agricultural systems to extract profit through seed patents, genetic modification technologies, and chemical input dependencies. The rhetoric of feeding the hungry masks the reality of feeding corporate bottom lines.

The Alliance for a Green Revolution in Africa, despite its humanitarian branding, functions as a mechanism for extending corporate control from laboratory to village farm. The close institutional and financial ties between the Gates Foundation and Monsanto, combined with the mandated use of genetic modification technologies in US food aid policy through the Lugar-Casey Act, reveal the alignment of philanthropic and corporate interests in reshaping African agriculture. When coupled with intellectual property regimes imposed through TRIPS and UPOV that criminalize farmers' age-old practices of saving and sharing seeds, the picture that emerges is one of systematic dispossession rather than development.

Comparative perspectives from India, Japan, and the United States illustrate that seed sovereignty struggles are global, though they take different forms in different contexts. India's tragic wave of farmer suicides, the United States' profound food insecurity despite agricultural abundance, and Japan's plural approaches to seed governance all demonstrate that corporate seed control creates vulnerabilities rather than securities. Meanwhile, farmer-managed seed systems across Africa have proven their viability, resilience, and capacity to ensure food security through local knowledge systems, agrobiodiversity, and climate-adapted varieties.

The November 2025 Kenyan High Court ruling declaring the criminalization of farmer seed practices unconstitutional represents a watershed moment, establishing legal precedent that farmers' ancient rights to save and share seeds supersede commercial interests. This decision, alongside the evidence from eight African case studies demonstrating the success of farmer-led seed systems, and the COVID-19 pandemic's revelation of informal seed systems' superior resilience compared to corporate supply chains, all point toward the same conclusion: true food security requires reclaiming seed sovereignty.

The path forward must prioritize farmer autonomy, indigenous knowledge systems, and biocultural rights-based approaches to seed governance. Policymakers must actively engage indigenous peoples and farmer movements in defining seed policies and laws, ensuring these recognize and reinforce existing customary laws that preserve genetic diversity and ensure seed access. Support for farmer-managed seed systems, community seed banks based on indigenous knowledge and rules, and indigenous plant breeding systems that have existed for millennia must replace the current trajectory toward corporate monopolization.

Mariam Mayet's call for exceptions to seed legislation to allow farmers the autonomy to preserve indigenous agriculture 'the bedrock to ensure ecological integrity, sustainability of nature, biodiversity, landscapes and ecosystems' (Shield, 2021) must be heeded. The food sovereignty movement's demand that the WTO 'get out of agriculture' remains urgent and necessary. Ultimately, the battle over seeds is a battle over the future of humanity itself: will we allow life's most fundamental processes to be enclosed, commodified, and controlled by a handful of corporations, or will we reclaim seeds as commons, as sacred gifts, as the foundation of genuine food sovereignty? The answer to this question will determine not only what we eat but whether future generations will have the autonomy to feed themselves at all.

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