RICH APPETITES: HOW BIG PHILANTHROPY IS SHAPING THE FUTURE OF FOOD IN AFRICA

EPISODE 2: SEEDS

A Companion Guide

AGRA WATCH

August 2022

This guide accompanies **Episode 2** of ***Rich Appetites: How Big Philanthropy is Shaping the Future of Food in Africa***, a short film series developed by AGRA Watch and the Alliance for Food Sovereignty in Africa (AFSA). The *Rich Appetites* series explains why exporting the US agribusiness model to Africa is a grave mistake, and promotes real, farmer-led solutions.

Learn more and watch all five films at www.richappetitesfilm.com

Companion Guide for Episode 2: Seeds
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AGRA Watch is a campaign of the Seattle-based Community Alliance for Global Justice that challenges the Bill and Melinda Gates Foundation's questionable agricultural programs in Africa, including its AGRA initiative, and promotes farmer-led alternatives.

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PRIVATIZATION IS NOT THE ANSWER

Debunking Common Myths about the "Need" for Privatized Seed, Land, and Knowledge

Over the course of the 20th century, agriculture has come to operate more like any other industry. As part of this process, the resources it depends on (such as seeds, land, and traditional knowledge and technology) have been increasingly commodified and privatized.

Commodification refers to the conversion of various human and natural processes into things that can be bought and sold. It means that a given resource is not only used as a means toward some other end, but seen as existing solely for monetary purposes. While all human societies have utilized parts of their environments to meet individual and social needs, it is primarily under capitalism that natural resources have been commodified in this way.

Privatization refers to the process of securing individual and exclusive rights to those things over things that were once public goods--like knowledge, seeds, land, food, and water. Advocates of privatization often claim that private ownership improves resource efficiency and discourages overexploitation, but studies have indicated that privately-owned resources are often more degraded than those that are governed collectively. [1] Advocates also claim that private property rights incentivize people to innovate; however, innovation and land improvements have long occurred, even without the recognition of private property rights.[2]

The Bill and Melinda Gates Foundation, AGRA, and other Gates-funded institutions have contributed to the commodification and privatization of agriculture in Africa in two main ways: 1) by promoting laws and conventions that encode Intellectual Property Rights (IPRs) protection in national laws (see Myths 1-3), and 2) by developing a Theory of Change that encourages a process of land consolidation among wealthier and better resourced farmers (see Myth 4).

MYTH 1: "Intellectual Property Rights will stimulate innovation and competition in the agricultural sector, which will produce more and better quality seeds at lower prices." [3]

Intellectual Property Rights privilege large corporations and laboratories, while restricting and undermining long-standing *in situ* crop development by farmers themselves.

What are IPRs?

The World Trade Organization (WTO) defines intellectual property as "creations of the mind," such as technological inventions and artistic productions.[4] The WTO's 1995 Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) obligated all member countries to implement and enforce Intellectual Property Rights (IPRs), but provided some flexibility in the types of *sui generis* systems that countries could develop to meet these obligations. In addition to protecting novel inventions or creative works, however, corporations have pushed for IPRs to apply to various other realms — including patenting seeds and other forms of life — and have allowed companies to profit from common resources.

Through laws instituting IPRs, governments allow inventors to apply for patents, trademarks, or copyrights that prevent others from using their inventions, except in exchange for payment.[5] In agriculture, patenting occurs through various mechanisms, including plant breeders' rights, trademarks, geographical indications and trade secrets.[6] Only the company or institute that is granted a patent for a plant variety can produce, reproduce, sell, export or import that variety; if anyone else wants to do so, it requires a license or permit.[7]

Effects of IPRs in agriculture

In theory, anyone with an interest in crop breeding could apply for seed patents. But many of the seed laws developed under dominant global frameworks contain strict definitions of who counts as a crop breeder, and the requirements for applying for seed patents are extremely stringent and often costly, with stipulations that only large and well-funded laboratories are likely to be able to meet. For example, in the US, applications for patents under the Plant Variety Protection (PVP) Act cost $5,150 and require a voucher sample of "3,000 untreated seeds that germinate at 85 percent or greater."[8] The scale and standardization required would likely be challenging for a farmer or *in situ* crop breeder to meet. Similarly, under plant varieties protection laws passed around the world, breeders must meet the requirement of genetic uniformity.[9] To verify this, a breeder must be able to examine genetic regulators (genes that control how other genes behave).[10] As a result, seed laws enable better-financed (often foreign) corporations and scientists to patent seeds. Moreover, plant variety protection laws' criteria, such as uniformity and stability, actively undermine genetic diversity in agriculture.[11]

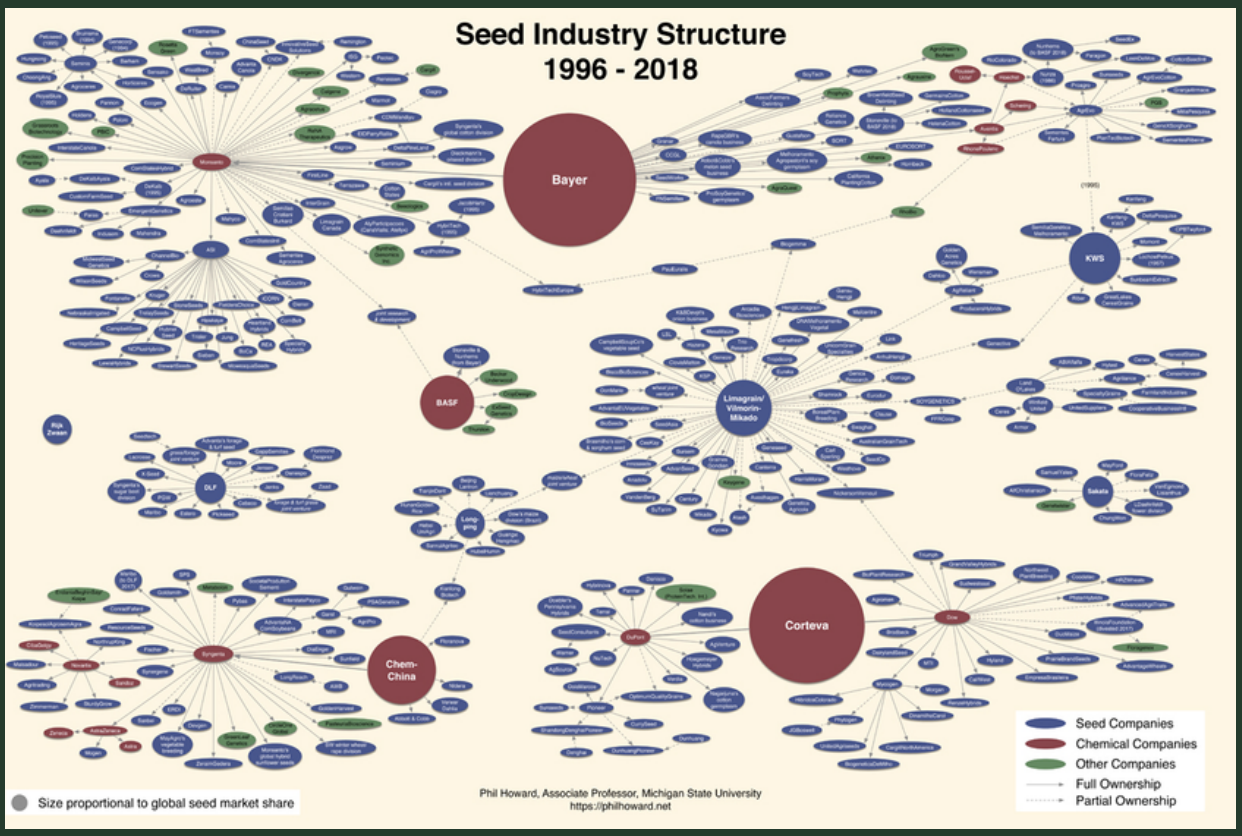
Rather than encouraging free competition and lower prices to farmers, the process lends itself to monopolization, allowing large seed companies to gain more market share and charge *higher* prices. Already, four seed corporations control over half of the global seed market.[12] Plant varieties protection laws in African countries will only exacerbate this trend, as large seed and agrochemical corporations are increasingly able to penetrate African markets.

While AGRA, AATF, and others claim to be helping small African seed companies thrive, at least some of these companies are linked to much larger corporations. For example, the largest seed company operating on the continent, SeedCo Ltd., was one of the beneficiaries of AGRA's Program for Africa's Seed Systems (PASS), which operated

from 2006 to 2016. SeedCo is partially owned by the French multinational seed company Limagrain — one of the five largest seed companies in the world as of 2020 — which bought a 28 percent share in the company in 2014.[13]

Even companies that remain locally- or nationally-owned have experienced consolidation. In Burkina Faso, the seed company Neema Agricole du Faso S.A. (NAFASO) has benefited from AGRA support, such that 90 percent of commercial rice seed is now produced and marketed by the company.[14] This would suggest that far from creating vibrant, competitive formal seed markets, AGRA support has helped to create monopolies at the national level.

In addition, some of the local seed companies and seed dealers that benefited from PASS use contract farming and outgrower schemes[15], which means that the resulting crops don't fully belong to the farmer but to the company or dealer. While in some cases contract farming can be beneficial, it essentially reduces farming to assembly line production and often exposes farmers to considerable environmental and financial risks (as, for example, when crops fail due to low rainfall).



Source: Phil Howard, Seed Monopoly Chart (2019)

It's also not true that people only innovate with the guarantee of private profits. The seeds in existence today have been domesticated, improved upon, and selected over many generations — not because of private property protections but because of human inventiveness and responsiveness to community and individual needs. Seed commercialization laws do not promote innovation in general, but instead protect and enable certain kinds of innovators — those corporations, labs, companies, and scientists whose only motivation is profit. As some scholars have pointed out, a restrictive definition of innovation (as limited to "modern," market-based technologies developed in the Global North) parallels colonial racial ideologies that centered a Eurocentric, productivist vision of "improvement," which was used as a justification for usurping land and resources.[16] The role of racial capitalism is further reflected in the fact that most institutions that

hold patents for novel crop varieties (and can therefore accrue profits for their sale) are based in the Global North, while most crop biodiversity is located in the Global South, where it has been maintained and developed through millennia of innovation by farmers.[17]

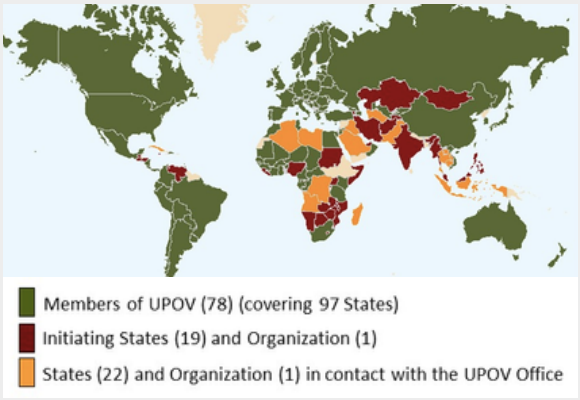
Crop domestication centers around the world. Source: Crop Trust, How Much Do Countries Benefit From One Another's Crop Diversity? (2016)

Over many years of prioritizing "modern" cultivars developed in labs, the world — especially the Global South — has lost numerous plant species that were central to people's lifeways and part of our common global heritage. Proponents of industrial agriculture and commercialized seed argue that crop diversity has in fact increased as a result of scientific advances in crop breeding, while critics have demonstrated decreases. Although one study suggests that there has not been a significant decrease in overall crop diversity as a result of seed commercialization[18], others estimate that 75 to 93 percent of *traditional* landraces[19] of crops disappeared over the course of the 20th century.[20] The plant varieties that have gone extinct were, by and large, developed over many generations and held in common as a part of cultural heritages. By contrast, the new varieties developed over the 20th century have been created by scientists in a handful of institutions—as such, there are critical issues of ownership, patent protection, and cultural meaning (or lack thereof). And while modern crop breeding may increase *intra*species diversity (i.e. distinct cultivars of one species), it focuses on a handful of key commercial crops, reducing *inter*species diversity and neglecting other culturally important and ecologically well-adapted crops.

MYTH 2: "The International Convention on the Protection of New Varieties of Plants (UPOV) is the only option available to African countries needing to pass laws on IPRs."

As a condition of WTO membership, African countries are required to implement some kind of intellectual property rights (IPRs) protections. However, there are different proposed models for how to do this. Among them are two competing and opposing frameworks: the **1991 International Convention on the Protection of New Varieties of Plants (UPOV)**, and the African Model Legislation for the Protection of the Rights of Local Communities, Farmers, and Breeders, and for the Regulation of Access to Biological Resources (also known as the **African Model Law**). However, this latter model law has been continually quashed by foreign interests and pressure from AGRA and other institutions.

UPOV is both an international agreement and an organization that seeks to delineate and protect intellectual property rights over new crop varieties developed by crop breeders. Initially created in 1961, the agreement was revised numerous times — most notably in 1991 (this iteration of the agreement is often referred to as UPOV 91 and paved the way for seed privatization). Countries that have signed on to UPOV are expected to pass plant varieties protection (PVP) laws, which are designed to promote the development of new seed varieties by allowing the patent holder to determine who may have licenses to sell that particular variety of seed. UPOV initially faced widespread rejection by communities, organizations, agricultural entrepreneurs, and countries, because of how the convention converts public, communal, and culturally-significant plant resources into private property. By 1968, only 5 countries had ratified the convention, and at the time of the last revision in 1991, only 20 countries were members.[21] Since this time, countries in the Global North have persuaded non-industrialized countries to ratify UPOV by including it in bilateral or regional trade agreements. As a result, 76 countries and 1 organization (the Africa Regional Intellectual Property Organization, ARIPO) have ratified the convention. In July 2015, ARIPO adopted the Arusha Protocol for the Protection of New Varieties of Plants, creating a regional framework for plant variety protection (PVP) that is in partial compliance with UPOV. As a result, many individual countries that are part of ARIPO are in the process of instituting laws that comply fully with UPOV. UPOV strongly prioritizes the rights of professional breeders over farmers practicing *in situ* crop breeding.[22]



Countries with membership in UPOV, as of November 3, 2021. Source: UPOV, Status in relation to UPOV (2021)

By contrast, the African Model Law was approved by the Organization for African Unity (now the

African Union) in 2000. The African Model Law met TRIPS requirements while also protecting farmers' rights. It rejected plant patents and the wholesale adoption of UPOV.[23] Yet the African Model Law has not been adopted by any African country.

The Gates Foundation has actively funded programs that push for UPOV-compliant seed laws and policy interventions, both through Alliance for a Green Revolution in Africa (AGRA) and through other grants. AGRA has been extremely influential in getting national-level plant varieties protection laws passed. AGRA and other proponents of these laws refer to this as "harmonization," and AGRA has directly lobbied for seed laws to be passed, as well as funding other grantees who do this work. From 2015 to 2018, AGRA invested in promoting seed law harmonization in Burkina Faso.[24] And from September 2018 to November 2019, AGRA invested US $235,470 in Nigeria's National Agricultural Seed Council for the development of plant variety protection laws in line with the interests of major plant breeders and UPOV.[25] The influence of AGRA and other corporate and intergovernmental actors is also clear at the regional level. For example, as a result of the involvement of these actors, the African Union recently passed restrictive, pro-industry seed policy frameworks that undermine civil society and farmer-managed seed systems, which supply the majority of seeds on the continent.[26]

Ghanaian protests against restrictive UPOV-compliant seed laws in 2014. Source: La Via Campesina, Seed laws that criminalise farmers: resistance and fightback (2015)

Nnimmo Bassey of HOMEF, an environmental organization that led the Nigerian protests against UPOV membership. Source: Prime Business Africa, HOMEF Drags FG To Court Over Plant Variety Protection Law (2021)

A number of movements have sprung up across the globe to resist UPOV-compliant PVP bills and other laws eroding farmers' food sovereignty. In Ghana in 2014, civil society and farmer organizations expressed serious concerns about the government's adoption of a bill based on UPOV 1991 and the intention to join the convention without public consultation. The bill was contested for undermining farmers' rights and enabling the entry of GMOs.[27] In Nigeria in 2021, hundreds of farmer groups, civil society organizations, and women protested against the new plant varieties protection bill that would bring the country in compliance with UPOV[28] (Nigeria ultimately upheld the law and was admitted to UPOV in August 2021).[29]

MYTH 3: "Seed laws and regulations will help farmers ensure access to high-quality seeds."

The seed laws currently being passed protect companies, not farmers. In fact, they heavily restrict farmers' practices and negatively impact the informal seed sector, which is highly efficient and culturally important.

In some cases, national PVP laws make it illegal for farmers to save or exchange saved seeds of patented varieties.[30] While some national laws offer nominal protections for what is referred to as "farmers' privilege" (i.e. the continued ability of farmers to replant seeds on their own land), there are various definitional ways that farmers' rights, cultural practices, and generational and Indigenous knowledge are hindered. For instance, many countries' seed laws do not define marketing or selling as restricted to monetary transactions alone, but also include bartering or free exchange.[31] South Africa's Plant Breeders Rights' Amendment Act of 1996 suggests that farmers are exempted from plant breeders' rights protections only insofar as they are using the varieties only on land occupied by them and do not share said varieties for "propagation by any person other than that farmer."[32] But South Africa's updated 2018 Plants Breeders Rights Act defines "selling" a plant variety as not only limited to monetary transactions but also "to exchange or to otherwise dispose of to any person in any manner"--which means that restrictions against selling seeds for which one does not hold a license could also be enforced against those giving away seeds. As such, these regulations may mean that traditional practices of exchanging and saving seeds could be interpreted as infringing on plant breeders' rights.[33] Additionally, the 2018 act suggests that subsequent decisions by government ministers can determine the size and type of farmers who can benefit from "farmers' privilege," the crops these exceptions do or do not apply to, and the uses to which these seeds may be put.[34]

PVP laws in other countries, including Nigeria and Ghana, include similar exemptions for farmers to use protected seed varieties for "personal use on their own holdings," so long as it is for private and "non-commercial" ends.[35] This provision, common many PVP and plant breeders' rights (PBR) laws, is further clarified by UPOV:

> **The propagation of a variety by a farmer exclusively for the production of a food crop to be consumed entirely by that farmer and the dependents of the farmer living on that holding, may be considered to fall within the meaning of acts done privately and for non-commercial purposes. Therefore, activities, including for example "subsistence farming", where these constitute acts done privately and for non-commercial purposes, may be considered to be excluded from the scope of the breeder's right, and farmers who conduct these kinds of activities freely benefit from the availability of protected new varieties."[36]**

> **"UPOV Contracting Parties have the flexibility to consider, where the legitimate interests of the breeders are not significantly affected, in the occasional case of propagating material of protected varieties, allowing subsistence farmers to exchange this against other vital goods within the local community."[37]**

The problem with these formulations, however, is that very few farmers meet these strict, narrow definitions of subsistence farming, often selling at least a small portion of their harvest. It is thus unclear and vague under what conditions small-scale farmers' saving, replanting, and sharing of seeds are exempted from plant breeders' rights laws.[38]

Furthermore, protecting plant breeders' rights over and above farmers' rights often ends up privileging outside firms. Around 60 percent of those institutions or individuals who held plant breeders' rights in South Africa as of 2011 were

foreigners based in Europe and North America.[39] At the same time, it has proven nearly impossible to reconcile UPOV-compliant laws with other international treaties guaranteeing access and benefit-sharing (ABS).[40] The traditional landraces that serve as the parent material for new varieties often do not meet criteria for distinctness, uniformity, and stability; as such, there are no provisions or mechanisms in many plant varieties protection laws and plant breeders' rights laws for benefit-sharing or recognition of traditional or Indigenous knowledge and crop breeding.[41]

Corporations and institutions are also able to profit from as-yet unpatented African seeds, which have been domesticated collectively over many generations. At the same time, these corporations use collaborations with public research institutions to help them access germplasm and develop a favorable policy environment for the commodification and privatization of seeds.

How does this work?

Crop breeding initiatives (including those that employ biotechnology) do not create seeds from out of nowhere — they require parent material. Most commonly, they get this parent material through seed banks, many of which are housed in CGIAR centers around the world. These seed banks include large amounts of diverse donated seeds, and historically have been free and accessible to all, based on the idea that they are part of the common heritage of mankind.

Locations of CGIAR centers around the world. Source: CIAT, CGIAR Around the World

Researchers, companies, and institutions then manipulate this parent material in order to produce novel varieties of seed. Then, they patent the novel varieties of seed, and are able to generate private profits from selling it and licensing its production. This is a form of what has been referred to as **biopiracy** —the theft of public seed and biological resources for the benefit of private companies. Biopiracy can happen in a variety of ways: researchers could use Indigenous knowledge of a plant's medicinal qualities to then extract a compound that can then be used to synthesize, mass produce, and sell a pharmaceutical product, or a company could use a naturally-occurring or domesticated plant with particular fungicidal properties to create commercial fungicides (as happened when the US Department of Agriculture and multinational corporation W. R. Grace attempted to patent a plant treatment made from the extract of seeds of the neem tree).[42]

As an example of how this has worked in reference to seed banks, in 2009 the International Center for Agricultural Research in Dry Areas (ICARDA), a CGIAR center, entered into a 3-year research agreement

with Impulsora Agrícola, a Mexican firm that acts as an agent for three breweries, one of which was acquired in 2010 by Heineken and the other two of which are companies owned by Grupo Modelo, itself partially owned by the massive Anheuser-Busch.[43] The international seed bank allowed exclusive private control over the barley lines required to develop new varieties and "elite germplasm" adapted to Mexico, for the benefit of beer production; this meant if requested by the company, distribution of the barley lines of interest would be withheld from any other party in Mexico. Rather than offering any concrete benefit sharing agreement that would redistribute any future profits from the new variety, the agreement vaguely suggested that any improved progeny would eventually be shared with farmers through an "international public goods spill-over."[44]

As another example, in 2014 the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), International Fund for Agricultural Development (IFAD), and Bioversity International attempted to "crowd-source" farmers' knowledge of stress-tolerant and climate-adapted crop varieties, via a public online survey.[45] This survey encouraged agricultural researchers, farmers, and people working with farming communities to provide detailed information about hardy crop species that would enable the group to "prioritize crops for climate change adaptation research and strengthen market links of stress-resistant crops." Yet the survey contained no mention of acknowledgement or benefit-sharing, were any of this information to result in successful climate-resilient cultivars being developed and commercialized.

Legally, corporations and institutions are obligated to follow access and benefit sharing agreements, as mandated by the Convention on Biological Diversity and the International Treaty for Plant Genetic Resources for Food and Agriculture, which would redistribute some of this profit back to the farmers who originally bred the parent seeds. In the case of many new varieties bred from germplasm donated to CGIAR seed banks, no benefit sharing has occurred.[46] Increasingly, these crop breeders have been granted exemptions to ABS agreements.

In addition, many of these public seed banks and the CGIAR as a whole have been increasingly

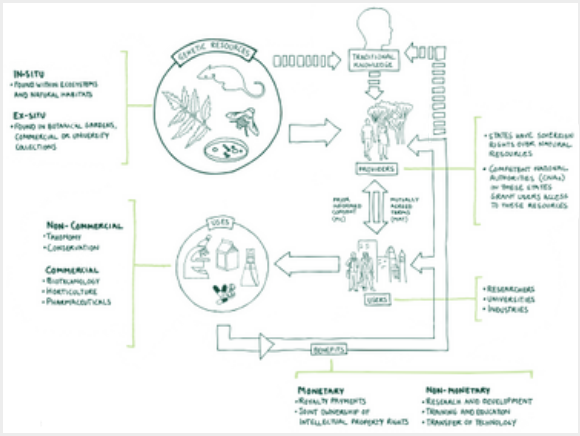
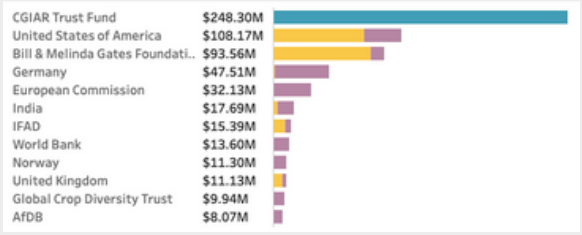


Diagram showing how access and benefit sharing works. Source: UN Convention on Biological Diversity

privatized, largely as a result of Gates Foundation funding since 2007. By 2010, the CGIAR system had structurally transformed to reflect a focus more on economic returns and cost-benefit analysis than on its original purpose as a public and social good. The function of the board of directors, for example, was converted from an advisory role serving scientists and crop breeders, into the central decision-making body, made up of members handpicked by the Gates Foundation — including Marco Ferroni, CEO of the Syngenta Foundation.[47] Additionally, a restructuring of voting power granted more votes to Europe (which has seven votes, compared to only one each for the entire regions of Pacific Asia, South Asia, West Asia, Latin America, and Sub-Saharan Africa), and granted a full vote to only one non-governmental entity: the Gates Foundation. This means that the weight of the Gates Foundation's vote is equal to that of the entire region of Sub-Saharan Africa.[48]



Top funders of CGIAR programs in 2021. Source: CGIAR Funder Analysis Dashboard (2021)

Top contributors to CGIAR Trust Fund since 2011 Source: CGIAR Trust Fund Contributions Dashboard

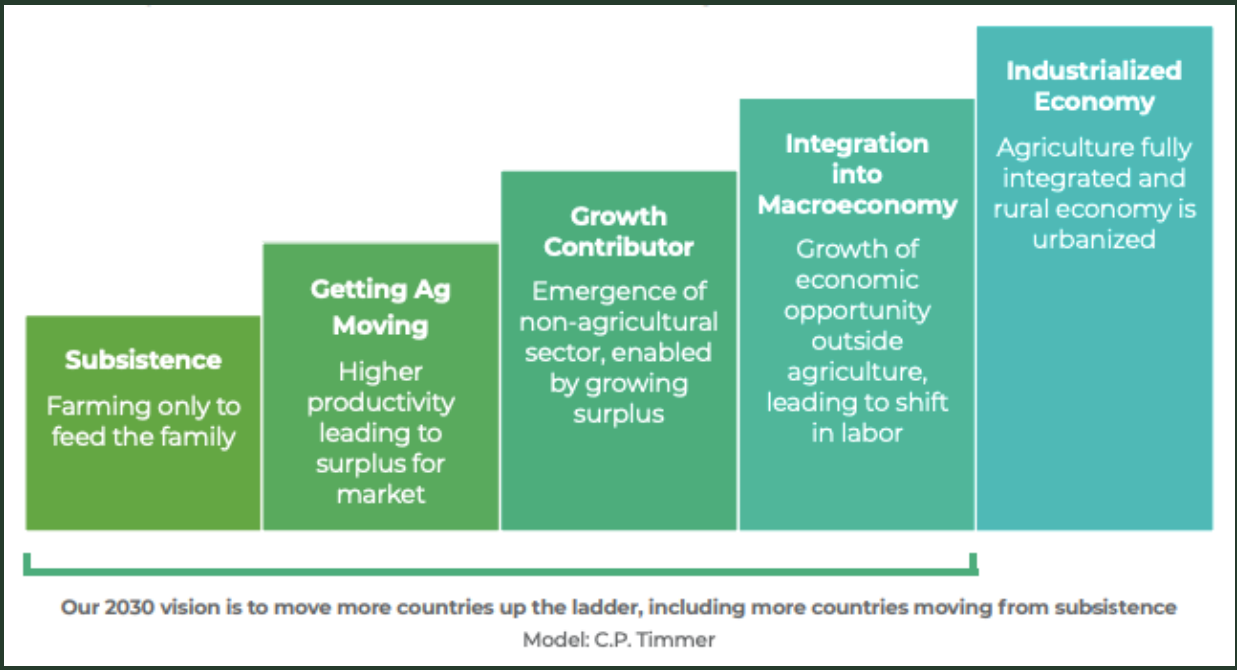
MYTH 4: "If AGRA succeeds in its goal of making African agriculture operate more like a business, this will allow for economic growth and diversification at the local and national levels."

AGRA's model of agricultural transformation is predicated on a large number of people leaving farming, increasing the commodification and consolidation of land in the hands of larger and wealthier firms. This is based on a flawed set of assumptions and Eurocentric experiences of economic change.

Numerous studies have found that AGRA and other Green Revolution programs in Africa mostly benefit large-scale commercial farmers for whom industry-produced inputs (like seeds and chemical fertilizers) and mechanization are cost-effective and who have stronger connections to markets through contract buyers.[49] Although AGRA claims to be helping small-scale farmers, their model of agricultural transformation both acknowledges and advocates for these inequalities among farmers. In their 2020 Annual Report, they state:

> "Our vision is an agriculture transformation that fundamentally changes how food is produced."[50]

Illustrating their perspective of agricultural transformation, they include a diagram from C. Peter Timmer's A *World without Agriculture*, which postulates an evolution from subsistence farming, to higher productivity enabling a surplus, to the emergence of a non-agricultural section, to the growth of that sector in ways that lead to a shift in labor, to a fully integrated and urbanized rural economy.[51] In embracing this model, AGRA makes clear that its leadership knows and assumes that many millions of people will have to abandon agriculture, enabling land consolidation and increased productivity by commercial farmers.



CP Timmer's model of agricultural transformation (Source: AGRA Annual Report, 2020)

And in the early 2000s, the Gates Foundation apparently also expressly advocated for this eviction trajectory, referring to it euphemistically as "land mobility."[52]

Inspired by modernization theory, this model reflects the "**Lewis path**." The Lewis path suggests that increasing agricultural productivity "frees up" surplus labor for industry. This process leads to industry-led economic growth, while also enabling revenues from agriculture to more closely approximate those in other sectors. When AGRA models "agricultural transformation" on the Lewis path, they assume that the urban industrial workforce will absorb displaced farmers, while larger farms will be able to more efficiently and cheaply produce food to sustain growing cities.

Farmer in Kolkata, India. Source: Rupak de Chowdhuri/Reuters, reprinted in The Guardian)

In fact, while cast as a general and universal model, the "Lewis path" has only been observed in industrialized countries of the Global North, where historical conditions produced by colonization, early capitalism, and emigration to other continents all played a role in agriculture and industry having the relationship they do today. In much of the rest of the world, the trend is the opposite: increasing numbers of farmers, who are poorer relative to other workers and other farmers elsewhere in the world.[53] AGRA's modeling of its theory of agricultural transformation on the"Lewis path" thus misapplies the historically- and geographically-specific experience of industrialization in Europe and the US (see our first companion guide for numerous critiques of this model) to contemporary African contexts. Moreover, estimates suggest that it would take an unprecedented and unrealizable 15 percent economic growth rate, sustained continuously for over 50 years, to absorb the rural exodus anticipated to be caused by the AGRA model.[54]

AGRA claims that it is working toward agricultural **intensification** — growing more on the same amount of land. However, studies indicate that marginal increases in yield under AGRA programs are actually due to **extensification** — growing more by expanding the acreage of farms (often through land and forest clearance).[55] This is dangerous ecologically (because of the impacts of newly cleared forests on carbon emissions and sequestration, as well as on biodiversity loss) and socially (because of the impacts of consolidating existing farmland).

Green Revolution models of agriculture on the African continent go hand in hand with attempts by the World Bank and other economic institutions to privatize land through individual titling and the creation of formal land markets. This is a form of commodification and enclosure, which imposes exclusive ownership over common resources and allows certain individuals to buy and sell land. This also goes against many existing customary land tenure systems and ideologies, in Africa and elsewhere.

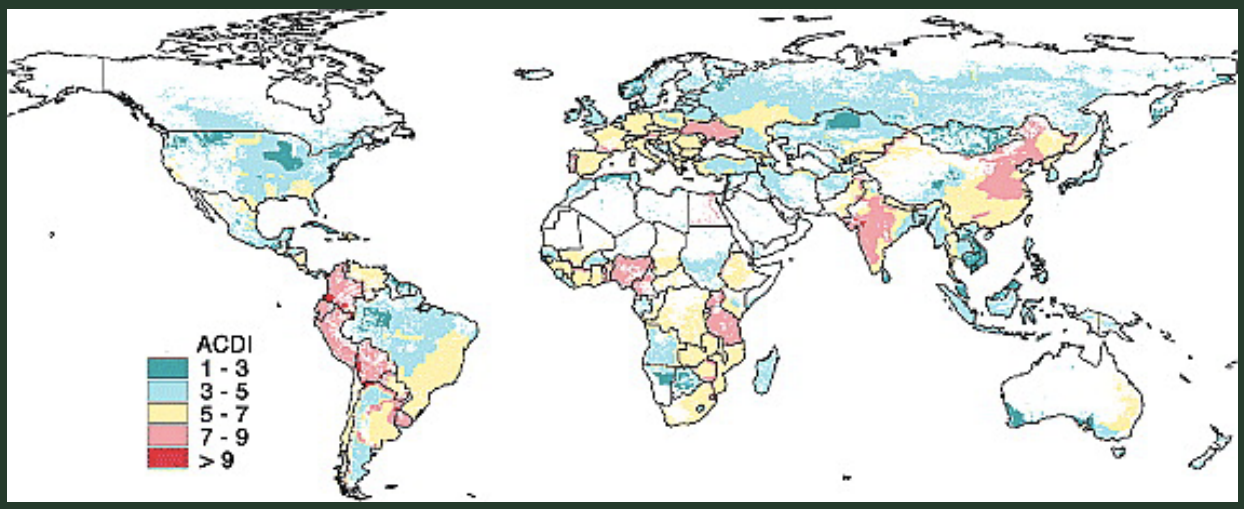
CONCLUSION

Proponents of privatization suggest that it encourages investment, innovation, and competition. This is based on the assumption that people will only be incentivized to create new ideas or inventions under conditions where their ability to profit is ensured. **This is untrue.** For millennia, people have innovated and improved agricultural systems, domesticated and developed new crop varieties, and managed land and resources held as part of the commons, without being guided primarily by a profit motive.

But privatization and commodification do enable powerful institutions and individuals to further consolidate their control over all aspects of the food system (and life more generally), from production through to consumption. Laws passed to protect private property rights over land, seed, and knowledge do not benefit farmers or consumers, but instead allow resources and wealth to be extracted from the Global South, and used to further enrich institutions in the Global North.

This pattern tends toward monopolization, standardization, and uniformity. At the present

time, a small number of companies control the vast majority of the world's commercialized seeds; at the same time, of the tens of thousands of known edible plant species on earth, globally we rely on only three — maize, wheat, and rice — for over 60 percent of our caloric intake from plants.[56]



Diversification of agricultural commodities, based on an Agricultural Commodity Diversification Index (ACDI) for major crops. Areas in teal specialize in a very small number of crops, while areas in red demonstrate a higher degree of diversification. For example, some parts of Africa grow and consume a range of products, including millet, maize, sorghum, cassava, rice, plantains, groundnuts, and pulses Source: Billie Leff, Navin Ramankutty, and Jonathan A. Foley, Geographic distribution of major crops around the world (2004)

Yet we require and thrive on diversity: from the genetic level, to the level of human societies, to ecosystems as a whole. Diversity is what enables experimentation, resilience, and adaptation to new conditions. There are many people and places who maintain diversity, even in the face of pressures toward uniformity. Most seeds in Africa are exchanged through informal seed networks, rather than through commercial ones. Most food in Africa (and in the Global South more generally) is produced by millions of small-scale farmers, including women. And many locally- and regionally-important crop species abound, which ensure nutrition and food security but are overlooked by international markets. Privatization allows the powerful to access, usurp, and co-opt these systems, and bring them into greater conformity with models of standardization, efficiency, and productivity developed in the Global North. This doesn't only reduce agricultural biodiversity — it reduces cultural and economic diversity as well.

Sources and Notes

[1] George Monbiot (1 Jan 1994), The Tragedy of Enclosure, Scientific American; Ruth Meinzen-Dick (14 Jun 2012), Elinor Ostrom's trailblazing commons research can inspire Rio+20, The Guardian

[2] Elinor Ostrom (1990), *Governing the Commons: The Evolution of Institutions for Collective Action;* Gregory Akall (2021), Effects of development interventions on pastoral livelihoods in Turkana County, Kenya, in *Pastoralism*

[3] UPOV (2011), Seminar on Plant Variety Protection and Technology Transfer: The Benefits of Public-Private Partnership

[4] World Trade Organization (nd), Intellectual Property: Protection and Enforcement

[5] Institute for Policy Studies (1999), Intellectual Property Rights and the Privatisation of Life

[6] Jayashree Wattal (1999), Intellectual Property Rights and Agriculture: Interests of Developing Countries, World Bank

[7] GRAIN (2015), UPOV 91 and other seed laws: a basic primer on how companies intend to control and monopolise seeds

[8] USDA (nd), PVPO Services and Fees

[9] UPOV (1991), International Convention for the Protection of New Varieties of Plants

[10] Jack Mitchell, Iain G. Johnston, and George W. Bassel (2017), Variability in seeds: biological, ecological, and agricultural implications, in *Journal of Experimental Botany*

[11] Crucible Group (1994), *People, Plants, and Patents*, IDRC

[12] Phil Howard (2018), Global Seed Industry Changes Since 2013

[13] SeedCo Group (nd), Our Story; The Ecologist (13 Oct 2014), Big Biotech's African seed takeover. According to 2020 sales figures, Limagrain comes in fifth after BASF, with revenues of 1.4 billion euro and 1.9 billion euro, respectively.

[14] FIAN International for the Global Network for the Right to Food and Nutrition and the Global Convergence of Land and Water Struggles, West Africa (Feb 2018), Business profits or diverse food systems? Threats to peasant seeds and implications in West Africa

[15] Natural Resources Institute (2019), End of Program Evaluation for AGRA Africa's Seed Systems Programs

[16] Matt Canfield (forthcoming), The Ideology of Innovation: Philanthropy and Racial Capitalism in Global Food Governance, in *Journal of Peasant Studies;* Aaron Eddens (2019), White science and indigenous maize: the racial logics of the Green Revolution, in *Journal of Peasant Studies*

[17] ibid.

[18] Mark van de Wouw et al. (2010), Genetic diversity trends in twentieth century crop cultivars: a meta analysis, in *Theoretical and Applied Genetics*

[19] A landrace is a variety of a crop species that has acquired distinctive characteristics due to developing, adapting, and being cultivated in conditions particular to a localized geographic region. In addition to this distinctiveness, landraces often display high degrees of genetic diversity.

[20] Food and Agriculture Organization (1999), What Is Happening to Agrobiodiversity? It is worth noting that the origin of these statistics has been questioned by subsequent studies, given the difficulty of accurately enumerating crop diversity losses and the fact that the statistics are difficult to trace back to an original study. See Colin K. Khoury et al. (2022), Crop genetic erosion: understanding and responding to loss of crop diversity, in *New Phytologist* for additional discussion of these numbers, and Paul J. Heald and Susannah Chapman (2009), Crop Diversity Report Card for the Twentieth Century: Diversity Bust or Diversity Boom? in *SSRN* and Andrew Porterfield (3 Sept 2015), Anti-GMO myth busted—We're not losing plant genetic diversity after all, for the Genetic Literacy Project (a pro-GMO advocacy group), for methodological critiques of the original unpublished report the FAO statistics were based on. In spite of issues with statistical estimates, many studies have confirmed

a general trend toward decreasing crop and dietary diversity over the past 50+ years, with further plant biodiversity loss predicted in the future. See Colin K. Khoury et al. (2014), Increasing homogeneity in global food supplies and the implications for food security, in *Proceedings of the National Academy of Sciences*, and Bruno Lanz, Simon Dietz, and Tim Swanson (2018), The Expansion of Modern Agriculture and Global Biodiversity Decline: An Integrated Assessment, in *Ecological Economics*.

[21] Alianza Biodiversidad and GRAIN (6 Apr 2021), UPOV: The Great Seeds Robbery

[22] GRAIN (2015), UPOV 91 and other seed laws: a basic primer on how companies intend to control and monopolise seeds

[23] Titilayo Adebola (2020), Africa and Intellectual Property Rights for Plant Varieties, in *Oxford Bibliographies;* Titilayo Adebola (2020), Mapping Africa's Complex Regimes: Towards an African Centred AfCFTA Intellectual Property Protocol, in *African Journal of International Economic Law*

[24] ITAD (2020), Mid-term evaluation of AGRA's 2017–2021 strategy implementation

[25] KIT Royal Tropical Institute (2020), Nigeria Outcome Monitoring Report 2019, AGRA-PIATA Programme

[26] African Centre for Biodiversity (2021), Harmonisation of seed laws in Africa; African Centre for Biodiversity (23 Feb 2021), African Union endorses draconian, undemocratic and corporate captured policy guidelines for seed and biotechnology for the continent

[27] APBREBES (2014), Massive Protests in Ghana over UPOV style Plant Breeders' Bill

[28] Edu Abade (9 July 2021), CSOs reject GMOs in Nigeria, seek urgent review of NBMA Act, The Guardian

[29] Margaret Le Galle (18 Oct 2021), Nigeria's plant variety protection: in line with international IP norms, Managing IP

[30] UPOV (2006), Plant Variety Protection Gazette and Newsletter

[31] La Via Campesina (8 Apr 2015), Seed laws that criminalise farmers: resistance and fightback, GRAIN

[32] Republic of South Africa (1976), Plant Breeders' Rights Act, with amendments through 1996

[33] Republic of South Africa (2011), Plant Breeders' Rights Policy

[34] Republic of South Africa (2018), Plant Breeders' Rights Act

[35] Republic of Ghana (2013), Plant Breeders' Bill

[36] UPOV (2009), Explanatory Notes on Exceptions to the Breeder's Right under the 1991 Act of the UPOV Convention

[37] UPOV (nd), Frequently asked questions

[38] UPOV (2009), Explanatory Notes on Exceptions to the Breeder's Right under the 1991 Act of the UPOV Convention

[39] Republic of South Africa (2011), Plant Breeders' Rights Policy

[40] Florian Rabitz (2017), Access without benefit-sharing: Design, effectiveness and reform of the FAO Seed Treaty, in *International Journal of the Commons*

[41] Republic of South Africa (2011), Plant Breeders' Rights Policy

[42] Vandana Shiva (2016), *Biopiracy: The Plunder of Nature and Knowledge*

[43] ETC Group (Jan/Feb 2012), The Greed Revolution: Mega Foundations, Agribusiness Muscle in on Public Goods (Communiqué no. 108)

[44] Andrew Mushita and Carol Thompson (2019), Farmers' Seed Systems in Southern Africa: Alternatives to Philanthrocapitalism, in *Agrarian South: Journal of Political Economy*; ICARDA (30 Sept 2011), Breeding activities of the ICARDA Barley Program in Mexico; ETC Group (Jan/Feb 2012), The Greed Revolution: Mega Foundations, Agribusiness Muscle in on Public Goods (Communiqué no. 108)

[45] CGIAR (28 Jan 2014), Share your crop knowledge: Help identify stress-tolerant species, Bioversity International and CIAT

[46] Andrew Mushita and Carol Thompson (2019), Farmers' Seed Systems in Southern Africa: Alternatives to Philanthrocapitalism, in *Agrarian South: Journal of Political Economy*

[47] ibid.

[48] ibid.

[49] James Boafo and Kristen Lyons (14 June 2021), Ghana's farmers aren't all seeing the fruits of a Green Revolution, The Conversation; Neil Dawson, Adrian Martin, and Thomas Sikor (2016), Green Revolution in Sub-Saharan Africa: Implications of Imposed Innovation for the Wellbeing of Rural Smallholders, in *World Development*

[50] AGRA (2020), Annual Report 2020

[51] C. Peter Timmer (2006), A World without Agriculture: The Structural Transformation in Historical Perspective

[52] Although the original source (the foundation's confidential Agricultural Development Strategy, 2008-2011) cannot be located online, the quote can be found in xcroc (9 Apr 2009), AGRA & Monsanto & Gates, Green Washing & Poor Washing, Crossed Crocodiles (blog) and Anuradha Mittal and Melissa Moore (2009), Voices from Africa: African Farmers and Environmentalists Speak Out Against a New Green Revolution in Africa, The Oakland Institute

[53] Bruno Dorin, Jean Charles Hourcade, Michel Benoit-Cattin (2013), A World without Farmers? The Lewis Path Revisited, CIRES Working Papers Series

[54] Rootstock Radio (19 Feb 2018), Eric Holt-Gimenez: Our Food System Isn't Broken

[55] Timothy Wise (3 Dec 2021), Africa's land use problem: Is Green Revolution agriculture a solution or a cause?, IATP

[56] Food and Agriculture Organization (1999), What Is Happening to Agrobiodiversity?