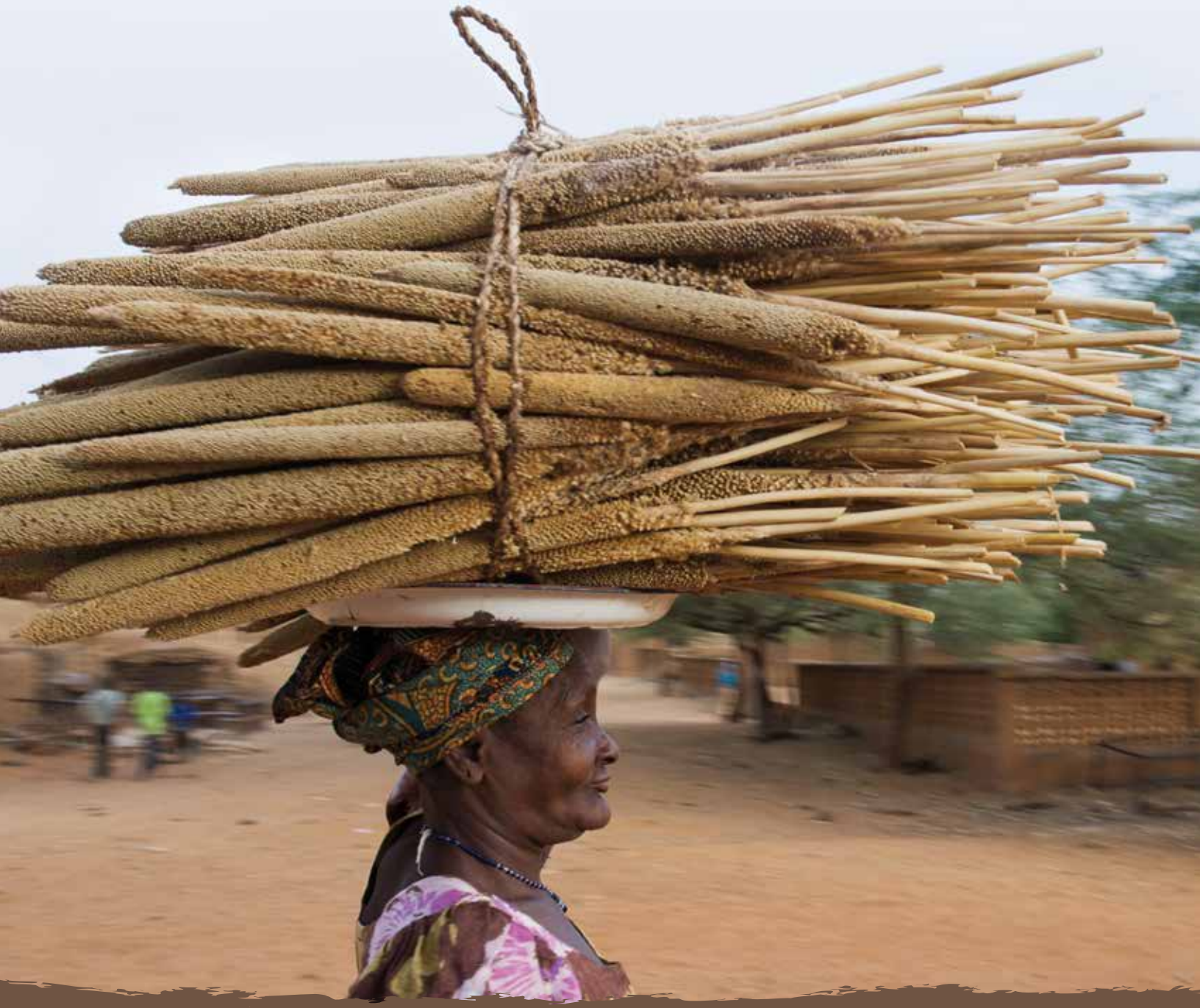
DOWN ON THE SEED

THE WORLD BANK ENABLES CORPORATE TAKEOVER OF SEEDS



The Oakland Institute

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Executive Summary

In 2013, at the demand of the G8, the World Bank launched the Enabling the Business of Agriculture (EBA) project to benchmark and score countries on how they facilitate corporate business in agriculture. The first comprehensive EBA report was released in January 2016. The report provided a detailed vision of the regulatory reforms, which, according to the Bank, are needed to create "thriving" agricultural sectors, and rated the agricultural policies of 40 countries.[1]

Among several categories of indicators (Finance, Transport, Fertilizer, etc.), the EBA includes a sub-indicator which evaluates seed regulations. Seed systems are complex and vary from country to country. However, over the past few decades, Western corporations and governments have made a global push to standardize seed laws and promote industrial seeds, often known as "improved" seeds. The EBA is the latest initiative aimed at promoting corporate-led seed production – the mantra being that this will help increase agricultural yields and feed a growing world population.

The EBA dictates so called "good practices" to regulate seed systems, and then scores countries on how well they apply and implement its prescriptions. These "good practices," focused on facilitating private companies' production and marketing of seeds, include: improving, accelerating, and minimizing the costs of procedures to release and certify industrial seeds; and "incentivizing" private seed production by adopting intellectual property right (IPR) frameworks to allow corporations to profit from their seeds' sale and usage.

Despite the Bank's claim that granting property rights to private seed developers will spur innovation, there is no conclusive evidence that the adoption of IPR frameworks leads to an increase in private investments in seed research and development.[2] The EBA promotes IPR regulations that conform to the International Union for the Protection of New Varieties of Plants (UPOV) Convention, rather than sui generis laws[3] adapted to local contexts. The latest UPOV convention, signed in 1991, prohibits farmers from exchanging and selling IPR-protected seeds, and restricts their right to save and propagate protected seeds. The EBA is already starting to have an impact at the country level. For instance, in Rwanda, it inspired the design of a new seed ordinance that opens the door for the country's adhesion to the UPOV Convention.

While the Bank's reforms do not benefit the majority of farmers, they do assist with the expansion and increased profits of a handful of private companies. Six firms, all based in the West, currently control over two-thirds of the formal seed market.[4] In recent years, these corporations have scaled up efforts to take control of developing countries' markets, notably in Africa, where Dupont acquired the South African seed company Pannar in 2012, Syngenta bought the Zambian Maize Research Institute (MRI) in 2013, and Vilmorin & Cie acquired 30 percent of Zimbabwe's Seed Co in 2014.[5]

While the concentration of the global seed market has a significant impact on prices[6] as well as seed diversity, the EBA not only fails to tackle this issue, it also remains blind to other flaws of corporate seed production. For instance, industrial varieties calibrated to pass quality control tests display high levels of genetic uniformity and are bred with a focus on high-yield properties. This comes at the expense of other features including an aptitude for intercropping and conservation, nutritional and cooking qualities, and other characteristics useful to farmers and consumers. In addition, private seed companies tend to focus on breeding widely used crops (corn, soybean, cotton, etc.) to ensure a return on their investments through massive commercialization.[7] The lack of improvement and breeding of other crucial crops such as legumes, "minor" cereals (e.g. oats, barley, millet), vegetables, fruits, and more, means farmers have fewer options to diversify their crops.

The replacement of farmers' seeds with a few uniform industrial varieties leads to the rapid erosion of global seed diversity. Following the 1960s Green Revolution, the cultivars of rice available to Filipino farmers dropped from some 4,000 varieties to just 3 to 5 "improved" varieties.[8] The same pattern was noticed through other Asian countries as well as Mexico, ultimately resulting in the loss of traditional varieties and seed saving practices, the dependence on external input providers, and farmer indebtedness.[9]

The EBA completely ignores farmer-managed seed systems, which provide 80 to 90 percent of the seeds used in developing countries and are vital repositories of the world's agrobiodiversity.[10] This immense bias cannot lead to the creation of sound, inclusive, and sustainable seed policies. Farmer-managed seed systems encompass both on-farm seed saving and farmer-to-farmer exchanges. They provide a rich diversity of seed, varieties adapted to local conditions, and ensure cheaper and often more reliable access to seed than formal systems, which remain weak in many developing countries. The main international donors

and the World Bank, however, dismiss these advantages and view increasing agricultural yields through the adoption of chemical inputs and industrial seeds as the key to feed the world. This vision overlooks the true causes of hunger around the world – lack of access to land, inequality, poverty, market dynamics, environmental degradation, climate change, and more.

Farmer-managed seed systems, while vital to preserve access to diverse seeds for food security and resilience, do face challenges. For instance, seeds may not move freely between farmers (access may depend on social status, kinship, and other cultural norms); seed stocks and exchange networks may be negatively affected by famines, natural disasters, and conflicts; and access to varieties with specific features (quality, pest resistance) may be lacking.[11] Given the World Bank dismisses farmer-managed systems, it ignores many low-cost and effective solutions to address the constraints. For instance, community-based seed production and participatory breeding projects foster the breeding of locally-adapted crops, improve plant quality and access, and empower farmers to innovate in their own fields.[12] Governments can establish policies to support growers who specialize in the multiplication, production, and sale of seeds; use extension services to establish farmer-managed nurseries and seed multiplication operations; revitalize local seed markets through attracting seed vendors to seed fairs; and help create communal seed banks to restore farmers' seed stocks and safeguard access to seed.[13] Finally, it is possible to improve access to seed by facilitating the release of diverse and high-performing varieties stored in national genebanks to farmers. Instead, the World Bank's EBA encourages states to ease private companies' – and not farmers' – access to genebanks.

The World Bank's one-size-fits-all approach does not help governments implement solutions adapted to farmers' needs. This requires direct engagement and collaboration with rural communities. Farmers should be the primary stakeholders to be consulted for the design of seed policies, as they are best suited to identify constraints and needs regarding access to inputs.

Ignoring the calls of a wide range of experts for bottom-up seed solutions that benefit the poorest,[14] the World Bank's agribusiness indicator will foster seed scarcity for the sake of corporate profit. The Bank fails to provide any evidence on how the EBA reforms will help feed nine billion people by 2050. The EBA makes developing countries' governments adopt standardized agriculture policies when a true commitment to end hunger and poverty would necessitate a radically different approach to respect and ensure farmers' right to seeds.

Introduction

Without seeds, there is no harvest, no food, no life. Around the world, this vital input is made accessible by farmers' own work to recycle and save seeds from their crops, and through farmer-to-farmer gifts, exchanges, and trade. Farmer-managed seed systems supply on average 80 to 90 percent of the seeds used for agriculture in developing countries, and play a key role in supporting agricultural production worldwide.[15] In addition, farmer-managed systems are crucial for preserving agrobiodiversity, food security, and resilience against climate and economic shocks. They provide a rich diversity of seeds, including varieties adapted to specific environmental conditions or with other characteristics useful to smallholder farmers.[16]

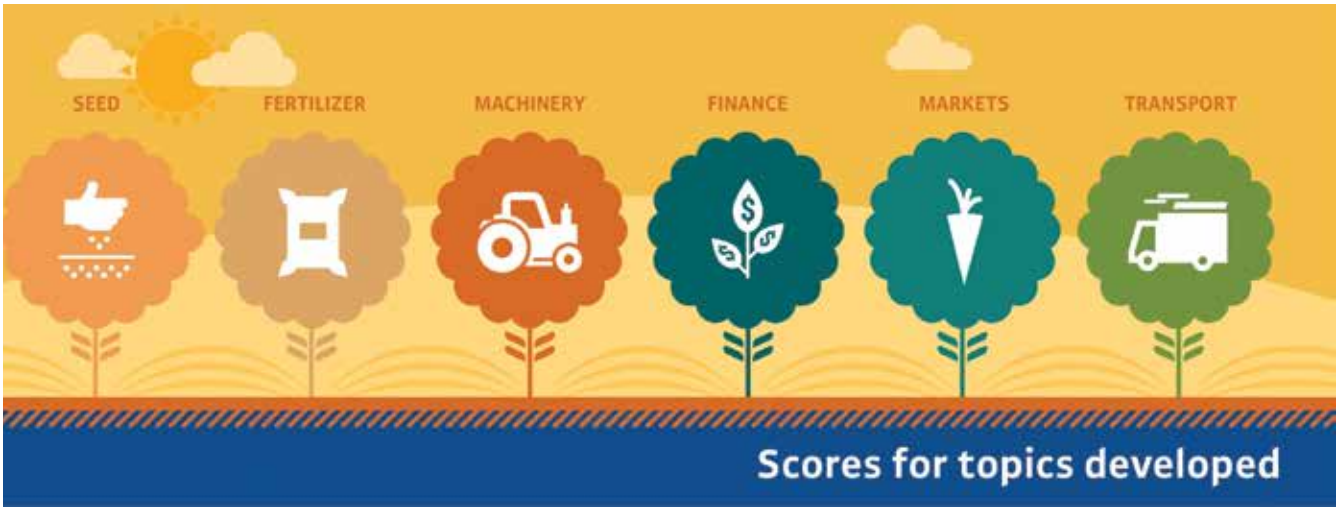
The main international donors and the World Bank, however, dismiss these advantages. They argue that increasing agricultural yields through the adoption of chemical inputs and industrial seeds (formal sector seeds are also commonly called "improved" seeds) are key to feeding the world. This paradigm benefits an exclusive cartel of Western companies that dominates the agricultural inputs market. Only six multinationals currently control over two-thirds of all commercial seed sales.[17] Greater market concentration is to be expected in the coming years if major mergers between agribusiness multinationals are approved by the US and the EU regulators.[18] The pending mergers between Monsanto and Bayer; Syngenta and ChemChina; and Dow and Dupont mean that only three mega corporations will control 63 percent of the commercial seed market.[19]

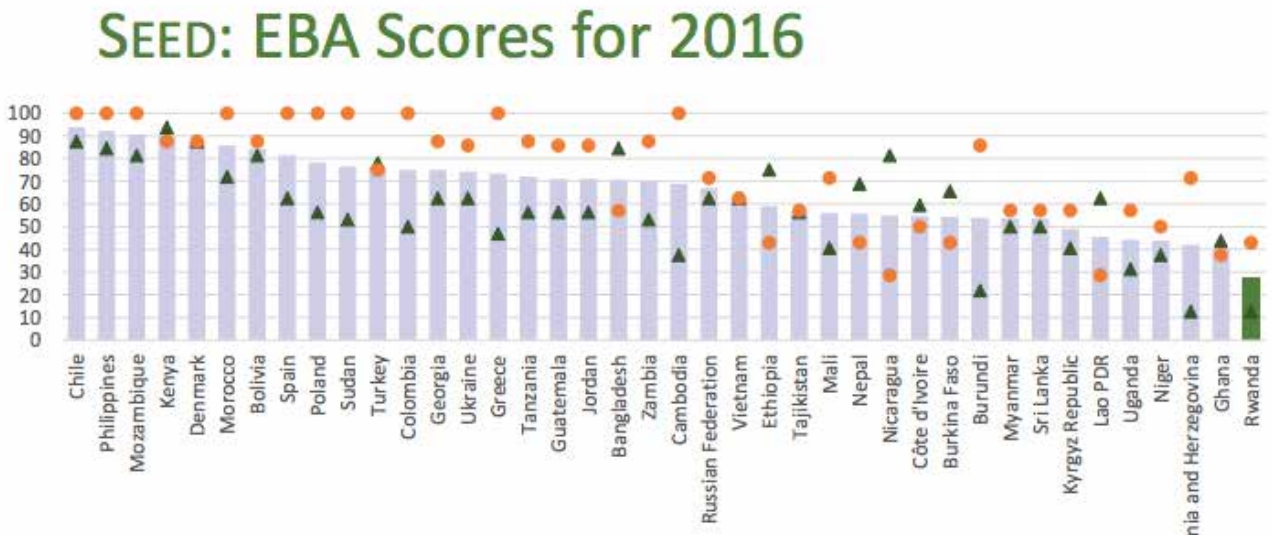
Two essential instruments are enabling the expansion of large seed companies in developing countries: farmer outreach and input subsidy programs, which distribute and promote industrial seeds (often with the support of

bilateral donors);[20] and aggressive lobbying for new laws that promote private sector seeds over farmer-managed systems.[21] The tools used to impose pro-corporate seed regulations in developing countries include trade treaties, donor-funded advisory services, and, more recently, the establishment of benchmarking instruments such as the World Bank's Enabling the Business of Agriculture (EBA).

Launched in 2013, the EBA aims to foster "policies that facilitate doing business in agriculture and increase the investment attractiveness and competitiveness of countries."[22] To achieve this, the World Bank prescribes "regulatory practices" that governments should implement in various areas of agricultural sectors, including Markets, Transport, Machinery, Finance, Fertilizer, and Seed. Countries are then scored on how well they apply and fulfill the EBA-dictated norms, which are misleadingly presented as "smart and balanced" policies.[23]

This Brief looks specifically at the EBA's Seed sub-indicator, through which the Bank is promoting reforms to facilitate the registration and commercialization of industrial seeds, along with "good practices" to incentivize private seed research and development through recognition of intellectual property rights (IPRs) of breeders. The Brief reviews these reforms and their potential impact on farmers' access and control over seeds, and examines how the World Bank's biased propositions increase the profits of a handful of private companies instead of promoting farmers' rights and protecting agrobiodiversity.





2016 EBA benchmarking topics and seed scores © World Bank Group

BOX 1: The EBA, a Doing Business in Agriculture Index

In 2012, the G8 tasked the World Bank with creating a "Doing Business in Agriculture Index," which would support its newly launched New Alliance for Food Security and Nutrition.[24] In 2013, the EBA – initially called Benchmarking the Business of Agriculture (BBA) – was launched with financial support from the US, UK, Danish, and Dutch governments[25] and the Bill and Melinda Gates Foundation.[26] An initial pilot survey of 10 countries was published in November 2014,[27] followed by a second publication benchmarking a total of 40 countries in January 2016. The next report, planned for release in January 2017, extends EBA coverage to over 60 countries.[28]

The EBA's selection of survey countries spans all continents and income levels, but its application is largely directed at the developing world. Some EBA donors indicate a specific focus on influencing agricultural policymaking in Africa. Advisors of the New Partnership for Africa's Development (NEPAD) are being trained in the use of the EBA, while the Bank's staff is reaching out to governments and African institutions to foster acceptance of the project as a tool to improve agricultural policy.[29]

The EBA, modeled after the World Bank's Doing Business index, which inspired over 520 business-friendly reforms between 2003 and 2013,[30] is an attempt to gain similar influence in the agricultural sector. The Bank claims that the tool is "generating evidence" on regulations supporting agricultural development,[31] however, no scientific data has been shared to support the EBA's selection of "good regulatory practices."

Denouncing the top-down imposition of policies detrimental to farmers and food security, *Our Land Our Business,* a multi-continental campaign of over 280 organizations, comprised of farmers groups, trade unions, and CSOs, was launched in 2014,[32] demanding the end of both the EBA and the Doing Business projects.

The EBA's "Good Practices"

Organize Seed Systems to Benefit Private Companies

A keen supporter of the industry-coopted "New Green Revolution," the World Bank considers private sector seeds as "a key technology for improving agricultural productivity."[33] Through the EBA, the Bank asserts the need for "good regulatory practices" to facilitate the introduction of industrial seeds into agricultural markets.

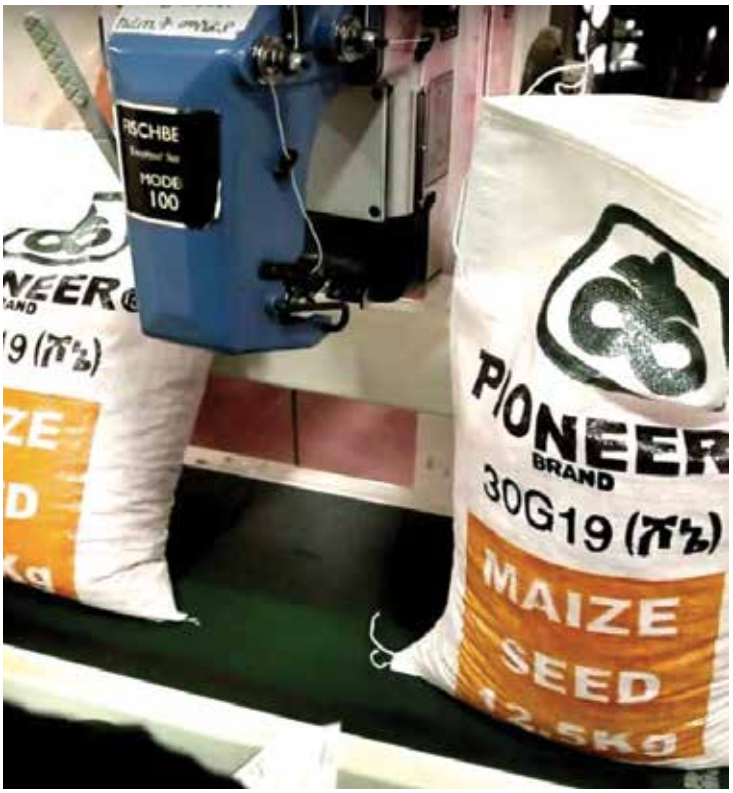
This is how it works. The Bank encourages governments to implement reforms to reduce the cost and time necessary to register industrial seeds, establish a variety release committee (VRC) to approve industrial seeds for commercialization, create catalogs to list registered varieties, and more.[34] The Bank docks points off countries' EBA scores if these systems aren't in place and if they do not meet a number of requirements set by the Bank. For instance, a lower EBA score is attributed if the VRC exists but does not meet regularly (the World Bank recommends that VRCs meet on demand or after each cropping season).

While most rich countries have long established such procedures and services, fulfilling these standards requires substantial public spending from low-income nations. In fact, some aspects of the EBA methodology excessively burden developing countries. For instance, the World Bank encourages lowering fees to register industrial seeds and emphasizes the "good performance" of high-income nations, which have the cheapest registration costs relative to the national income. Denmark, for example, charges only 8 percent of its income per capita to register a new seed, and Spain charges 10 percent.[35] Relative fees are generally higher in lower-income countries: Ethiopia, for instance, charges 89 percent of the income per capita for seed registration procedures. This makes Ethiopia appear as a bad performer in the Bank's report, although in hard figures, Ethiopia's registration costs are almost ten times lower than Denmark's ($489 against $4,641).[36] If Ethiopia were to charge only 8 percent of the income per capita, the registration fee would be $44. While some would argue that this scoring methodology reflects the obstacles that national companies encounter to register new seeds, the Bank cannot ignore that industrial seed development is dominated by multinational companies, who most benefit from lower costs.

The domination of multinational seed companies has globally expanded in recent years. In Africa, for instance, Western agribusinesses have acquired some of the continent's largest and best performing seed companies. Between 2012 and 2014, US-based Dupont Pioneer bought South Africa's Pannar Seed, Swiss seed giant Syngenta acquired Zambia's Maize Research Institute (MRI), and the French Vilmorin & Cie acquired 30 percent of Zimbabwe's SeedCo.[37] Over the past decade, these foreign seed companies have made significant investments in seed Research and Development (R&D) programs in Africa.[38]

The World Bank places corporations at the center of every aspect of seed systems. For instance, no less than five different EBA survey questions score the composition of the VRC that supervises the introduction of new seed varieties. For a country to get the best score, it has to give 50 percent or more of the VRC's seats to the private sector. The Bank attributes a score of zero if all seats are occupied by public actors, for instance, experts from the Ministry of Agriculture or research institutions.

This strong stance to increase private sector representation suggests a total lack of consideration of farmers, consumers, and the environment. The EBA methodology accords a country a maximum score if all VRC members are from the private sector, even though this raises serious concerns about transparency, independence, and the competence of the authorities presiding over the release of new seed varieties.



Dupont maize seed in Ethiopia © New Alliance for Food Security and Nutrition

BOX 2: Corporate Support for the EBA

The World Bank has repeatedly portrayed the EBA as a pro-poor and pro-farmer initiative, but it is the large agribusinesses who will benefit the most from the project. The Bank appealed to the "expertise" of the largest agrochemical firms in the world to develop the EBA, including Bayer, Monsanto, Syngenta, Pioneer, Yara, and KWS.[39] The list of "global experts" consulted by the project does not include a single farmer group or cooperative, and counts only five non-profit organizations: GALVmed, FINCA, One Acre Fund, the International Fertilizer Development Center, and the Syngenta Foundation.[40] The three latter openly promote the use of industrial seeds and fertilizers.

In response to critics pointing to the lack of consultations with the farmers and civil society organizations,[41] the World Bank published a record of EBA presentations made to various stakeholders in the UK, the US, and six lower-middle income countries.[42] The Bank is more discrete about its active participation at industry-sponsored conferences including the 2015 International Food and Agribusiness Management Association Conference,[43] 2015 Grow Canada Conference,[44] 2016 Argus FMB's Africa Fertilizer,[45] and 2016 International Fertilizer Association Conference.[46]

Evidencing the EBA's popularity with large agribusiness firms, in 2016, the International Grain Trade Coalition (IGTC), a lobby of large grain traders, formed a working group to support the EBA.[47] IGTC organized private sector responses to the EBA surveys and performed outreach to WTO government representatives and corporate stakeholders about the project.[48] This is particularly worrying, given this coalition works to influence pro-GMO trade and agriculture regulations.[49] Far from promoting the interests of small producers, the EBA is working to give large corporations an opportunity to influence agricultural policies worldwide and foster farmers' dependence on expensive industrial inputs.

"Incentivize" Private Investments in Seed Sectors

The EBA promotes reforms to "incentivize the private sector to release new varieties in the country."[50] The Bank, thereby, accords better scores to countries that grant breeders intellectual property rights over seeds, allow the private sector to multiply and commercialize local public varieties, and provide easy access to germplasm conserved in public genebanks to private companies, among other reforms supposed to enhance private research and development of new seed varieties.

The World Bank's advocacy in favor of property rights for plant breeders is part of a global push for IPR frameworks in agriculture. This movement has been driven by the powerful seed industry, which increasingly dominates research in plant breeding over publicly funded R&D programs.[51] The granting of IPRs over seeds is done through patent systems, plant variety protection (PVP) frameworks such as those outlined by the International Union for the Protection of New Varieties of Plants (UPOV) Convention, or through sui generis systems[52] elaborated by national legislators.[53]

The goal of PVP laws is to allow plant breeders to secure exclusive rights over the varieties they develop, so that they may retrieve profit from the commercialization, reproduction, and use of their varieties by other parties.[54] Breeders with exclusive rights may choose to market their variety and profit from the sale of seeds, or may license it to other companies in exchange for a fee. The granting of such breeders' rights is supposed to reflect the fact that developing new plant varieties requires investment, since promoters of PVP laws, like the World Bank, argue that "protecting the property rights of seed developers spurs further innovation."[55]

However, there is no conclusive evidence that IPR laws will significantly increase private investments in plant breeding in developing countries.[56] In addition, the EBA upholds UPOV membership as a regulatory paradigm, at the expense of sui generis legislation that may be better adapted to local needs. For instance, the 2016 EBA report praises Tanzania for becoming "bound by the 1991 UPOV Act in November 2015," even though it already had a PVP law in place.[57] The Tanzanian PVP legislation stipulates that farmers can be charged under criminal law – they risk fines and imprisonment – for using and exchanging protected seeds without the breeder's authorization.[58] The use of non-certified seeds is also prohibited in Tanzania's official rice irrigation schemes.[59] Recently, the World Bank indicated that both Vietnam[60] and Rwanda have used the EBA to design their new seed ordinances.[61] In Rwanda, the new law establishing PVP regulations conforms to the UPOV Convention (see Box 3).[62]

Cowpea seeds germplasm on display at IITA's genebank © International Institute of Tropical Agriculture (IITA)

BOX 3: Rwanda's New Seed Law: EBA-Inspired Framework to Protect and Profit Private Breeders

On April 20, 2016, the Rwandan government promulgated a new seed law (Law No. 0005),[63] which matches the EBA's recommendations. The new legislation introduces a PVP framework to protect breeders' rights for a period of twenty years.[64] The implementation of this new law will put Rwanda on the path to adhere to UPOV 91,[65] a treaty that prohibits farmers from selling and exchanging IPR-protected seeds and restricts their right to save and propagate protected seeds on their own holdings.[66] Following this promulgation, the Netherlands, one of the donors to the EBA project, initiated a training program to educate Rwandans on how to implement breeders' rights in conformity with the UPOV guidelines.[67]

Several other aspects of Law No. 0005 are modeled after regulatory practices promoted by the EBA. For instance, the law establishes a Committee responsible for the "evaluation, certification and registration of plant varieties and their withdrawal from the list."[68] The establishment of official variety lists is a key instrument to outlaw the exchange and sale of farmers' seeds, which cannot be registered and protected under the UPOV framework due to their variability (UPOV requires that seeds be proved "distinctive," "uniform," and "stable" to be eligible for protection[69]). Finally, the Rwandan government released a new reduced fee schedule for seed registration and intellectual property services. The EBA scores positively the existence of fee schedules for certification activities carried out by the public sector and promotes the reduction of cost and time of seed registration procedures.[70]

These reforms do not seek to address the needs of Rwandan farmers, but copy a regulatory model promoted by the seed industry and Western donors as being the one that will attract private investors and enhance seed development and innovation.[71]

The Dutch Inspection Service for Horticulture trains Rwandans to implement breeders' rights in conformity with the UPOV guidelines
© Agroberichen / Buitenland

Public actors, including parastatal seed companies, research centers, and universities, also perform conventional plant breeding. The EBA, however, dismisses public seed development on the grounds that public investments in agricultural research "have declined in many countries since 1997."[72] The Bank conceives governments' role to be that of passive enablers of private sector breeding activities. An exception is the maintenance of national genebanks, which is seen as an essential task for the public sector, so that private companies may easily access public germplasm to develop new varieties of seed.[73] Public genebanks hold genetic resources freely collected from farmers' fields, which seed multinationals are actively seeking to commoditize.[74] Since 2012, a coalition of corporate and institutional stakeholders has developed the "DivSeek" program, which aims to sequence and digitize genetic materials held in genebanks around the world.[75] This initiative has been denounced by farmer groups as patenting and privatization of public genetic resources.[76]

While enabling increased corporate grip on public genetic resources, the World Bank overlooks the pressing need to make genebank varieties available to farmers. Research shows that direct collaboration between genebanks and farmers is highly beneficial. The release of locally-adapted genebank varieties, for instance, can help farmers access useful biological resources to adapt to climate change.[77] In Ethiopia, it was found that over 20 percent of local varieties perform better than industrial seeds bred specifically for drought resistance.[78] Ethiopia's genebank is the largest in Africa, holding 60,000 accessions – i.e. samples of seeds collected from a particular area.[79] Mobilizing such resources to provide farmers with varieties that produce higher yields at lower costs than drought-resistant hybrids can significantly enhance smallholders' livelihoods. Collaboration with farmers can also help enrich genebank collections with the genetic diversity cultivated in farmers' fields.[80]

Deploying genebanks' diverse resources widely and increasing linkage with rural communities helps conserve agrobiodiversity, improve farmers' incomes, and address climate change and food security challenges. However, policy mechanisms often fail to establish genebank-to-farmer connections. In Rajasthan, India, growers have lost access to the traditional pearl millet varieties that perform best in drier areas.[81] Yet over 30,000 traditional pearl millet accessions are stored in India's two main genebanks. Farmers have expressed willingness to pay for obtaining these varieties at the market prices of hybrids, but government extension services promote the use of hybrids instead of local varieties.[82] The World Bank could encourage policymakers to establish mechanisms to identify genebank varieties that outperform industrial seeds, and use extension services to disseminate them in regions where they are lacking. Instead, the EBA's narrow regulatory framework orchestrates the monopolization of public genetic resources by private breeders. The maintenance of genebanks requires significant staff, material, and financial resources, but many genebanks in the world run on precarious funding and are under staffed.[83] While governments continue to bear the cost of maintaining functional genebanks, the EBA's "good practices" do not take into account the necessity of channeling back a share of private companies' profits into the public systems that serve them.

In vitro cultures at Ghana's national genebank in Bunso © Luigi Guarino

The Impact of the EBA Reforms

Restricting Farmers' Right to Seed

The World Bank's prescriptions on how to regulate seed sectors maximize private companies' profits and expand their markets. This, however, jeopardizes farmers' access to seed, thus threatening the very basis of our food chain.

UPOV-inspired PVP laws exclude the protection of farmers' varieties,[84] and prohibit farmers from selling and exchanging PVP-protected seeds. Furthermore, the latest UPOV Act, signed in 1991, rendered optional the granting of a "farmer's privilege," previously established in the 1978 Act to allow growers to save and propagate protected seeds on their own farms.[85] The new convention specifies that the farmer's privilege should be granted "within reasonable limits and subject to the safeguarding of the legitimate interests of the breeder," so as not to curtail breeders' profits.[86] UPOV 91 also extends the duration of breeders' rights, so that varieties are now protected for a minimum of 20 years instead of 15.[87]

In addition to restricting farmers' right to seeds, IPR systems can negatively impact access to genetic resources for further research. UPOV 78 included an additional exemption, called the "breeder's exemption," to preserve free access to protected seeds for research and breeding purposes. This clause was restricted by the 1991 Convention.[88] Thus IPRs can become anti-innovation mechanisms, when PVP regulations or patents become tools to appropriate genetic resources.[89]

Beyond IPR-related issues, seed registration and certification laws like those promoted by the EBA frequently have collateral effects that extend beyond organizing formal seed sectors.[90] Oftentimes, these laws are accompanied by clauses making the marketing or exchange of non-registered seeds illegal.[91] The scope and enforcement of these laws varies across countries, but some lower-middle income nations implement very restrictive regulations prohibiting both the selling and sharing of non-certified seeds. In Colombia, for instance, authorities may seize the seed, harvest, or products made from harvest; destroy crops; and fine or jail farmers who sell or share non-registered "illegal" seeds.[92]

The creation of variety catalogs, which the EBA promotes, is an important instrument to enable such restrictive laws, as catalog-listed seeds are considered "legal" for marketing and non-listed seeds as "illegal." The variety register model, which originated in Germany and was applied regionally with the creation of the European Common Catalog in 1966,[93] is now being exported to other regional organizations such as South African Development Community (SADC, with 15 member countries) and Common Market for Eastern and Southern Africa (COMESA, with 19 members).[94] In both COMESA and SADC's seed catalogs, only maize varieties developed by Syngenta or Monsanto are listed.[95] Regional catalogs and laws require that seeds traded between countries correspond to industrial production standards, and render illegal the trade of farmers' seeds across borders.[96]

SADC SEED CATALOGUE **VARIETIES OF: MAIZE**

Variety name	Maintainer	Owner	Days to maturity	Plant height cm	Husk cover	Grain type	Grain color	Potential yield (t/ha)	Resistance to disease
DK8031	Monsanto	Monsanto	120	180	Good	dent-like	white	6	Tolerant to MSV, GLS and blight
DKC90-89	Monsanto	Monsanto				flint-like	white		Tolerant to MSV, GLS and blight
DKC80-33	Monsanto	Monsanto	120		Good	dent-like	white	7	Tolerant to MSV, GLS and blight
DKC80-53	Monsanto	Monsanto	130		Good	flint-like	white	7	Tolerant to MSV, GLS and blight
DKC80-73	Monsanto	Monsanto	140		Good	flint-like	white	7	Tolerant to MSV, GLS and blight
SY455	Syngenta AG	Syngenta AG				dent-like	white		
SY514	Syngenta AG	Syngenta AG	125			flint-like	white	10	
SY614	Syngenta AG	Syngenta AG	130-135			dent	white	10	
SY624	Syngenta AG	Syngenta AG	135			dent-like	white	11	
SY634	Syngenta AG	Syngenta AG	135			intermediate	white	11	

Excerpt from the SADC regional seed catalogue, which only contains maize varieties manufactured by Monsanto and Syngenta © SADC

The EBA's policy prescriptions therefore obstruct farmers' right to freely reproduce, share, and exchange seeds and lead to the progressive loss of traditional varieties and seed production techniques, which are repositories of famers' proficiency and power. Women farmers, in particular, remain unrecognized stewards and transmitters of traditional seed saving and selection techniques.[97] Women's control over their seed supply – mostly provided by their own seed stocks as well as local networks – is crucial for households' nutrition and resilience to economic shocks and crops failures.[98] The 2016 EBA report boasts the addition of a cross-cutting "gender" theme,[99] but the World Bank's policy regulations around seeds are particularly detrimental to women.

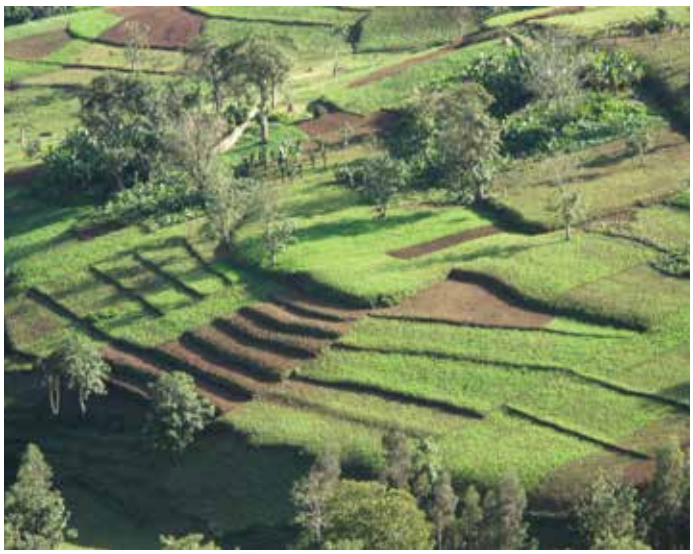
By lending its support to the seed industry oligopoly, the World Bank sets the stage for a private takeover of seeds and input price surges. In the US, where farmers overwhelmingly rely on industrial seeds, the price of crop seed has risen faster than any other input. Between 1990 and 2010, seed prices more than doubled relative to the price farmers receive for their crops,[100] indicating a disempowerment of farmers in the face of rising market concentration. It is therefore necessary to enact laws that curb the concentration of seed markets and protect traditional knowledge in order to prevent the cycle of debt and poverty caused by a dependency on expensive inputs.

Excluding Farmers' Seeds: A Flawed Approach to Feeding the World

The World Bank describes the EBA as an attempt to "develop the business of agriculture" to help meet the world's growing food demands, but its approach, largely focused on increasing agricultural yields, is deeply flawed. Current estimates indicate that agriculture already produces enough to feed up to 14 billion people.[101] Rather than increasing yields, the challenge of food insecurity must be addressed by tackling lack of access to land, inequality, poverty, market dynamics, environmental degradation, climate change, and more.

Smallholder farmers, who produce 70 percent of the food consumed worldwide,[102] play a key role in helping meet the world's food needs sustainably. Evidence shows that the productivity of small farms is often higher than that of large farms, and that smallholders are the best stewards of their land.[103] To maintain yields and healthy ecosystems, small-scale farmers rely on a wide diversity of plant varieties, which have been selected over many generations for their quality and suitability to local conditions.

This carefully cultivated agrobiodiversity helps sustain communities through times of environmental crisis, rising population density, and other threats. In Ethiopia's Gamo Highlands, traditional practices relying on plant diversity – over 40 varieties of barley and 100 varieties of banana are cultivated in the region – and active seed exchange have preserved food security and resilience of local populations. By contrast, neighboring communities who practice intensive monocropping on the plateau of Wolaita experience annual food shortages and decreasing soil fertility.[104] In Papua New Guinea, an average family grows between 30 and 80 species of food crops.[105] Such diversity ensures nutritious diets and helps farmers endure periods of drought as well as heavy rains. Papuans' taro varieties, for instance, survive prolonged rains, but are negatively affected by droughts, during which farmers rely on sweet potato and cassava for food staples.[106]



In Ethiopia's Gamo Highlands, traditional agriculture practices preserve high levels of agrobiodiversity © Leah Samberg

This resilience is lost under Green Revolution's approaches based on heavy use of industrial inputs, which cause tremendous biodiversity losses. Between the 1960s and 1980s, the Philippines lost some 4,000 cultivars of rice, Bangladesh lost 7,000, and Indonesia 15,000. This genetic wealth was replaced in farmers' fields by a handful of hybrid varieties,[107] which resulted in loss of traditional seed production and saving practices, increased dependence on external input providers, and farmer indebtedness.[108] Worldwide, agrobiodiversity is eroding at an alarming rate due to climate change, environment degradation, and standardization of seeds and crops. The UN's Food and Agriculture Organization (FAO) estimates that 75 percent of crop diversity has been lost since the 1900s, and that

no more than 12 plant species and five animal species now provide 75 percent of the food consumed worldwide.[109]

The EBA reforms will further aggravate this trend, as they confine policymaking to facilitating corporate seed production and marketing while ignoring crucial issues surrounding industrial seed systems. Formal seed registration and certification tests, indeed, tend to focus on seeds' productivity and genetic homogeneity properties. They therefore incentivize the breeding of uniform and high yielding seeds at the expense of other plant features that may be useful to farmers (e.g. aptitude for intercropping and conservation, nutritional and cooking qualities, yield of secondary products such as fodder or straw, etc.), and ultimately result in loss of biodiversity.[110] The passing of tests to release conventional seeds requires significant investment. Consequently, companies tend to focus on producing varieties that are broadly cultivated (maize, soy, wheat, etc.),[111] and have a wide adaptability, to ensure a return on investment. [112] Private plant breeding therefore neglects less profitable but nonetheless vital crops (such as oats, barley, millet, etc.), as well as varieties better adapted to specific agroecological zones and open-pollinated varieties that farmers can recycle from one harvest to the next. [113]

Trends of acquisition and mergers in the seed sector have reinforced these tendencies, as many independent companies with specialized portfolios have ceased the production of seeds with smaller market shares after being purchased by larger firms.[114] Seminis, the world's largest vegetable and fruit seed company, progressively acquired smaller companies in the 2000s before being bought by Monsanto in 2005.[115] In the consolidation process, Seminis discontinued some 2000 varieties it used to commercialize.[116] The abandoned crops were generally those with unique qualities, bred for niche markets, and those adapted to complex environments and low use of chemical inputs.[117] Without this diversity, farmers' ability to produce sustainably and resist environmental stress is dramatically reduced.

Going Beyond the World Bank's EBA: Building Seed Systems that Benefit Farmers

The EBA uses misleading language, calling industrial seeds as "quality seeds" [118] and conveys the perception that famers' seeds are unworthy of policy support.[119] This fails to recognize that conventional seed production, whether public or private, relies on a capital of genetic resources nurtured by farmers, who are the primary and most indispensable stewards of biodiversity. [120] It is clear that farmer-managed seed systems do face some challenges. These are often linked to seed circulation – which may be hampered by certain social or cultural norms or by seed storage and management constraints – and availability – famines, natural disasters, and conflicts may deplete local seed stocks, and varieties with specific properties (high-yielding, pest-resistant) may be scarce or unavailable.[121] However, solutions exist to enhance the quality and distribution of seeds within these systems and without relying on corporate seed production.

Participatory plant breeding approaches, for instance, promote decentralized collaborations between NGOs, public actors (for instance national research centers), and rural communities. These initiatives put farmers in the driver's seat during the design and implementation of breeding work, empower farmers to innovate in their own fields, and improve plant quality and seed access. The FAO recognizes these initiatives as being better at addressing the needs of small-scale famers than conventional packages of industrial inputs.[122] Many successful participatory breeding programs have been documented, including in Honduras, Timor Leste, Rwanda, India, and much more.[123] In Cameroon, the World Agroforestry Center identified with farmers their preferred species of trees (instead of commercially relevant timber species, farmers preferred undomesticated native fruit and fertilizer trees) and helped create farmer-managed nurseries. The program organized farmer trainings in genetic selection techniques and domestication of wild trees. Domesticated tree species were then introduced on farms to diversify cultures of cash crops (cocoa, coffee).[124] Processing and marketing techniques helped commercialize the products from the native trees such as fruits and nuts. As farmers' incomes increased, they reinvested the profits in the building of roads, bridges, storage warehouses, irrigation systems, and other infrastructures to benefit the community.[125]

Such initiatives cannot take off with the World Bank's one-size-fits-all approach, as it relies on consultation and deep collaboration with farmers to assess their needs and tailor solutions to their problems. Yet farmer-managed seed systems do support successful business models. Some

growers specialize in the multiplication, production, and sale of seeds,[126] and circulate seeds through local networks, often reaching remote locations and disseminating valuable information on varieties' properties and planting methods.[127] In Uganda and DRC, two war-stricken countries, the organization of seed fairs attracted numerous vendors and helped restore households' seed stocks, boost the local economy, and improve agricultural productivity.[128] In Zimbabwe, a local seed bank initiative enabled a drought-affected community to save over 6 tons of seed in just four years. The seed bank serves as a buffer in times of individual or community crop failure.[129]

A seed fair in Democratic Republic of Congo © Alexa Reynolds, ACF DR Congo

Rising environmental and economic challenges require policymakers to support local seed access and help diversify crop varieties and incomes. In Zambia and Malawi, severe droughts pushed governments in the 1980s to promote cassava as an alternative to maize, the dominant mono-crop in these countries, which is drought-prone, water-intensive, and heavily reliant on subsidized seeds and fertilizers. Governments mobilized extension services to diffuse high-yielding and pest resistant varieties of cassava, which farmers could freely reproduce in their fields. These diversification efforts had positive effects on business (cassava processing and marketing improved) and food security, particularly for the poorer and female-headed farm households.[130] Though rejected by the EBA, public sector plant breeding is more likely to take into account countries' and farmers' needs and development of crops of less commercial interest (legumes, perennials, open-pollinated crops, etc.).[131] This is in opposition to the "New Green Revolution" doctrine, which relies on corporate development of drought-resistant maize and other technological fixes that further undermine farmers' self-sufficiency and freedom.

Through the EBA, the World Bank reduces farmers' role to that of seed consumers and confines policymaking to the privatization of seed systems. Yet there are many ways governments can support the participation of farmers in breeding and distributing beneficial varieties. The World Bank continues to ignore the calls of a wide range of experts and institutions for bottom-up seed solutions benefiting the poorest[132] and remains entrenched in the defense of corporate interests. This not only jeopardizes the culture and livelihoods of farmers in developing countries, but also contradicts the primordial wisdom, which, for millennia, has pushed humans to nurture, improve, and exchange the earth's rich resources.

Farmers consult together to select and save a diverse variety of seeds in the banks © USC Canada - Mali

Conclusion

Since the EBA's inception in 2013, the World Bank and EBA donors have defended the project as a tool aimed at providing guidance to policymakers on the best regulatory practices to support thriving agricultural sectors and "inclusive agricultural transformation."[133] However the EBA's "guidance" is heavily skewed in favor of private agribusinesses, and the project is anything but inclusive of developing countries' and farmers' interests.

With the EBA, the Bank restricts policymaking to encouraging private development and marketing of industrial seeds and adopting PVP frameworks. This disproportionately favors private breeders at the expense of farmers' right to freely produce, save, and exchange seeds. The EBA's narrow regulatory framework is clearly inadequate for countries where farmer-managed seed systems dominate. In addition, it remains silent on the shortcomings of industrial seed systems, which have negative social impacts (criminalization of farmers' seeds, indebtedness linked to the buying of expensive seeds, loss of local knowledge and culture) and deep environmental flaws (erosion of agrobiodiversity, reduced resilience to climate variations, etc.).

Agricultural policies should emanate from national consultations with farmers and from in-depth analyses of local constraints to ensure efficient, sustainable, and affordable access to seeds. The Bank's quick regulatory fixes will prevent countries from establishing laws that strike a fair balance between farmers' and breeders' rights, and that address the need to preserve rapidly eroding agrobiodiversity as well as the traditions and cultural knowledge associated with this diversity.

This Brief shows that, with the EBA, the World Bank is orchestrating the privatization of seed systems and discrediting farmers' seeds for the sake of corporate profit. This is not consistent with the objective put forward by the promoters of the EBA to help feed nine billion people by 2050. To ensure food security of a growing population, access to seeds – the very basis of agriculture – must be extensively and unconditionally promoted.

Endnotes

1 World Bank. *Enabling the Business of Agriculture.* http://eba.worldbank.org/ (accessed August 22, 2016).

2 Maskus, K. E. *Private Rights and Public Problems: The Global Economics of Intellectual Property Rights in the 21st Century.* Washington, DC: Peterson Institute for International Economics, 2012; Agriculture and Rural Development Department. *Intellectual Property Rights. Designing Regimes to Support Plant Breeding in Developing Countries.* The World Bank, 2006. http://siteresources.worldbank.org/INTARD/Resources/IPR_ESW.pdf (accessed August 22, 2016); Bishaw, Z. and A.J.G. van Gastel. "Variety Release and Policy Options." In Ceccarelli, S.; Guimarães, E.P. and E. Weltizien (Eds). *Plant Breeding and Farmer Participation.* Rome: FAO, 2009. http://www.fao.org/3/a-i1070e/i1070e06.pdf (accessed August 22, 2016).

3 Countries develop sui generis plant variety protections to adapt IPR regulations to their national context. For instance, sui generis laws allow national legislators to choose the categories of innovations for which they want to grant breeders rights. See: Dang, R. et al. "Sui Generis Plant Variety Protection: The Indian Perspective." *American Journal of Economics and Business Administration*, 1.4 (2009): 303-312.

4 ETC Group. *Breaking Bad: Big Ag Mega-Mergers in Play. Dow + DuPont in the Pocket? Next: Demonsanto?* [Communiqué #115], 2015. http://www.etcgroup.org/sites/www.etcgroup.org/files/files/etc_breakbad_23dec15.pdf (accessed September 7, 2016).

5 Jones, G. *The Expansion of The Commercial Seed Sector in Sub-Saharan Africa: Major Players, Key Issues and Trends*. African Center for Biodiversity, 2015. http://acbio.org.za/wp-content/uploads/2015/12/Seed-Sector-Sub-Sahara-report.pdf (accessed August 22, 2016).

6 Fuglie, K., Heisey, P., King, J., and D. Schimmelpfennig. *Rising Concentration in Agricultural Input Industries Influences New Farm Technologies.* USDA Economic Research Service, December 2012. http://www.ers.usda.gov/amber-waves/2012-december/rising-concentration-in-agricultural-input-industries-influences-new-technologies.aspx#.V9B97z4rJcw (accessed September 8, 2016).

7 In the US, an industry estimate suggests that, in recent years, nearly half of all private seed-biotechnology research investments were devoted to the development of just one crop, corn. See: Heisey, P.W. *The Structure of US Agricultural and Food Research, with an Emphasis on Seed-Biotechnology Research*. USDA Economic Research Service, 2015. http://nabc.cals.cornell.edu/Publications/Reports/nabc_27/19_Heisey.pdf (accessed October 19, 2016).

8 GRAIN and PEAC. *From Green to Gene Revolution: How Farmers Lost Control of the Seeds from Agricultural Modernisation*. 2010. https://www.grain.org/article/entries/4151-from-green-to-gene-revolution-how-farmers-lost-control-of-the-seeds-from-agricultural-modernisation (accessed September 8, 2016).

9 *Ibid.*

10 Research estimates vary across countries and crops considered. For instance, the rate of use of industrial versus farmers' seed is often higher for maize, due to the promotion of industrial maize seeds through farm input subsidy programs. However, the United Nation's Food and Agriculture Organization (FAO) and recent literature reviews confirm the estimate that, globally, farmers in developing countries source 80-90 percent of their seeds within farmer-managed seed systems. See: FAO. "What Are Seed Systems?" *Plant Production and Protection Division (AGP)*. http://www.fao.org/agriculture/crops/thematic-sitemap/theme/compendium/tools-guidelines/what-are-seed-systems/en/ (accessed August 22, 2016); Coomes, O.T. et al. "Farmer seed networks make a limited contribution to agriculture? Four common misconceptions." *Food Policy* 56 (2015): 41-50.

11 Coomes, O.T. et al. *Op. Cit.*; Oakland Institute. *Seed Fairs In Post-Conflict Situations*. [Agroecology Case Studies], 2015. http://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/Seed_fairs_DRC_Uganda.pdf (accessed August 22, 2016).

12 Ojiewo, C.O. et al. *Community Seed Production*. [Workshop Proceedings], FAO & ICRISAT, 2015. http://www.fao.org/3/a-i4553e.pdf (accessed August 30, 2016); Ceccarelli, S.; Guimarães, E.P. and E. Weltizien (Eds). *Plant Breeding and Farmer Participation*. Rome: FAO, ICRISAT, ICARDA, 2009. ftp://ftp.fao.org/docrep/fao/012/i1070e/i1070e00.pdf (accessed August 22, 2016).

13 Oakland Institute. *Seed Fairs In Post-Conflict Situations. Op. Cit.*; Oakland Institute. *Mulch and Seed Banks: Conservation Farming in Zimbabwe*. [Agroecology Case Studies], 2015. http://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/Conservation_Agriculture_Zimbabwe.pdf (accessed August 22, 2016).

14 Bellows, A.C. et al (Eds). *Keeping Seeds in Peoples' Hands.* Right to Food and Nutrition Watch, 2016. http://www.righttofoodandnutrition.org/sites/www.righttofoodandnutrition.org/files/R_t_F_a_N_Watch_2016_ENG_WEB.pdf (accessed November 28, 2016); Frison, E. et al. *The Future of Food: Seeds of Resilience. A Compendium of Perspectives on Agricultural Biodiversity from Around the World.* Global Alliance for the Future of Food. http://futureoffood.org/wp-content/uploads/2016/09/FoF_Print_Compendium_82616_FA.pdf (accessed September 7, 2016).

15 FAO. "What Are Seed Systems?" *Op. Cit.*; Coomes, O.T. et al. *Op. Cit.*

16 Karthikeyan, M. and C.S.P. Patil. "Local Seed Systems: For Enhancing Food Security and Farm Resilience." *Agricultures Network,* April 25, 2014. http://www.agriculturesnetwork.org/magazines/india/cultivating-farm-biodiversity/local-seeds-systems (accessed August 30, 2016); Ojiewo, C.O. et al. *Op. Cit.*; Oakland Institute. *Low External Inputs Technologies and Biodiversity in Ethiopia.* [Agroecology Case Studies], 2015. http://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/Low_Input_Agriculture_Ethiopia.pdf (accessed August 30, 2016).

17 ETC Group. *Breaking Bad: Big Ag Mega-Mergers in Play Dow + DuPont in the Pocket? Next: Demonsanto? Op. Cit.*

18 Plumer, B. "Why the Debate Over the Bayer-Monsanto Deal is so Important for the Future of Farming." *Vox,* September 20, 2016. http://www.vox.com/2016/9/20/12988616/bayer-monsanto-dupont-dow-agriculture-mergers-innovation (accessed November 8, 2016).

19 *Ibid*; ETC Group. "The Monsanto–Bayer Tie-up Is Just One of Seven; Mega-Mergers and Big Data Domination Threaten Seeds, Food Security." September 15, 2016. http://www.etcgroup.org/content/monsanto-bayer-tie-just-one-seven-mega-mergers-and-big-data-domination-threaten-seeds-food (accessed September 23, 2016); ETC Group. "Mega-Mergers in the Global Agricultural Inputs Sector: Threats to Food Security & Climate Resilience." [Presentation], UN Committee on World Food Security, September 2015. http://www.etcgroup.org/sites/www.etcgroup.org/files/files/etcgroup_agmergers_22oct2015.pptx_.pdf (accessed November 8, 2016).

20 For instance, in 2014, USAID announced a five year long collaboration with DuPont Pioneer to expand hybrid maize seed adoption programs to reach thousands of smallholders across Africa. USAID has also been working with Syngenta since 2014 to train Nigerian farmers in the use of agricultural inputs such as improved seeds and fertilizers. See: USAID. "USAID and Dupont Announce Commitment to Increase Farmer Productivity and Food and Nutrition Security." January 23, 2014. https://www.usaid.gov/news-information/press-releases/jan-23-2014-usaid-and-dupont-announce-commitment-increase-farmer-productivity (accessed August 30, 2016); Dupont. "Advancing Food Security in Malawi & Ghana." *Action & Innovation*. http://foodsecurity.dupont.com/2014/10/28/advancing-food-security-in-malawi-ghana/ (accessed August 30, 2016); US Embassy in Nigeria. "New U.S.-Nigeria Partnership In Agriculture to Benefit More Than 500,000 Farmers." *News & Events*. http://nigeria.usembassy.gov/pe_08262014pg.html (accessed August 30, 2016).

21 AFSA and GRAIN. *Land and Seed Laws Under Attack. Who is Pushing Changes in Africa?* 2015. https://www.grain.org/article/entries/5121-land-and-seed-laws-under-attack-who-is-pushing-changes-in-africa (accessed August 30, 2016).

22 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices.* The World Bank, January 2016. http://eba.worldbank.org/~/media/WBG/AgriBusiness/Documents/Reports/2016/EBA16-Full-Report.pdf (accessed August 22, 2016).

23 World Bank. "About Enabling the Business of Agriculture." *About EBA.* http://eba.worldbank.org/about-us (accessed August 22, 2016).

24 The White House. "Fact Sheet: G-8 action on Food Security and Nutrition."

[Press Release], May 18, 2012. https://www.whitehouse.gov/the-press-office/2012/05/18/fact-sheet-g-8-action-food-security-and-nutrition (accessed August 18, 2016); New Alliance for Food Security and Nutrition. "About." *Commitments*. https://new-alliance.org/commitments (accessed August 18, 2016).

25 Communications with the Netherlands' Ministry for Foreign Trade and Development Cooperation and with Denmark's Ministry of Foreign Affairs revealed that the Dutch funding to the EBA ceased in June 2016, while the Danish government has not yet committed to renew funding to the project after 2016.

26 World Bank. "Enabling the Business of Agriculture. Project Donors & Partners." *About EBA*. http://eba.worldbank.org/about-us/donors (accessed August 22, 2016).

27 World Bank Group. *Enabling the Business of Agriculture 2015. Progress Report.* The World Bank, November 2014. http://eba.worldbank.org/~/media/WBG/AgriBusiness/Documents/Reports/2015/Enabling-the-Business-of-Agriculture-2015.pdf (accessed November 8, 2016).

28 USAID, Feed the Future. "Your Questions Answered about Enabling the Business of Agriculture!" *Agrilinks*. https://agrilinks.org/blog/your-questions-answered-about-enabling-business-agriculture (accessed August 22, 2016).

29 DFID, Development Tracker. "Support to the World Bank Project 'Benchmarking the Business of Agriculture.' (documents)." *Developing Countries, Unspecified.* https://devtracker.dfid.gov.uk/projects/GB-1-204123/documents (accessed August 22, 2016); Ministry of Foreign Affairs. "Internal Grant Committee Meeting. Broadening of the Benchmarking of the Business of Agriculture." [Agenda Item n°6], November 18, 2013. http://um.dk/%20search?q=Broadening%20the%20BBA.%20&filter=0 (accessed August 22, 2016).

30 World Bank Group. *Doing Business 2014, Understanding Regulation for Small and Medium-Size Enterprises*. The World Bank and International Finance Corporation, 2013. http://www.doingbusiness.org/~/media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB14-Full-Report.pdf (accessed August 17, 2016).

31 Martin-Prével, A. and F. Mousseau. *The Unholy Alliance. Five Western Donors Shape a Pro-Corporate Agenda for African Agriculture.* Oakland Institute, 2016. http://www.oaklandinstitute.org/unholy-alliance-five-western-donors-shape-pro-corporate-agenda-african-agriculture (accessed August 22, 2016).

32 Oakland Institute. "Our Land Our Business Campaign." *Issues: World Bank Group.* https://www.oaklandinstitute.org/our-land-our-business (accessed August 22, 2016).

33 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices. Op. Cit.*

34 *Ibid.*

35 *Ibid.*

36 *Ibid.*

37 Jones, G. *Op. Cit.*

38 *Ibid.*

39 World Bank. "Local Experts." *Enabling the Business of Agriculture.* http://eba.worldbank.org/local-experts (accessed November 8, 2016).

40 *Ibid.*

41 Mittal, A. "An Open Letter to World Bank's EBA Team." *Oakland Institute,* December 1, 2014. https://www.oaklandinstitute.org/open-letter-world-banks-eba-team (accessed November 9, 2016).

42 World Bank. "Stakeholder Engagement." *Enabling the Business of Agriculture.* http://eba.worldbank.org/how-we-engage (accessed November 9, 2016).

43 IFAMA. "2015 World Forum Program." *Annual Conference.* http://www.ifama.org/2015-Forum-Program (accessed November 9, 2016).

44 Grow Canada. "Agriculture Beyond Borders." *Grow Canada Conference 2015.* https://growcanadaconference.ca/wp-content/uploads/2015/01/GC-program.pdf (accessed November 9, 2016).

45 Argus FMB. *Africa Fertilizer 2016.* http://www.argusmedia.com/~/media/f8edff16209b4586957e75f47218b613.ashx (accessed November 9, 2016).

46 IFA. "Innovating in a Challenging Market." *Final Programme, 2016.* http://www.ifa-singapore2016.org/Programme/ConferenceProgramme.aspx (accessed November 9, 2016).

47 IGTC. "World Bank Working Group launched." *News.* http://igtcglobal.org/index.php?id=10&tx_news_pi1%5Bnews%5D=110&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=d82d69947b183130159091dc3edfeffd (accessed November 9, 2016).

48 IGTC. "IGTC President: Outreach mission in Rome and Geneva." *News.* http://igtcglobal.org/index.php?id=10&tx_news_pi1%5Bnews%5D=111&tx_news_pi1%5Bcontroller%5D=News&tx_news_pi1%5Baction%5D=detail&cHash=583b46ad82650d5a44e174c78dab26dd (accessed November 9, 2016); IGTC. "Newsletter." June 13, 2016. http://igtcglobal.org/index.php?id=166 (accessed November 9, 2016).

49 IGTC was initially formed to defend the agribusiness industry's interests within the Cartagena Protocol on Biosafety. In 2015, the giant food company Cargill indicated: "We support the use of biotechnology in agriculture and responsible commercialization of GM crops through our participation in the International Grain Trade Coalition." See: Cargill. *Cargill @150.* Corporate Responsibility Report, 2015. http://www.cargill.com/ebooks/2015_cr-report/html/11.html (accessed November 9, 2016).

50 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices. Op. Cit.*

51 De Schutter, O. *Seed Policies and The Right to Food: Enhancing Agrobiodiversity and Encouraging Innovation*. United Nations, General Assembly, 2009. http://www.farmersrights.org/pdf/RighttoFood-N0942473.pdf (accessed August 22, 2016).

52 See footnote 3 for a definition of sui generis laws.

53 De Schutter, O. *Op. Cit.*

54 UPOV. "Frequently Asked Questions." *About UPOV.* http://www.upov.int/about/en/faq.html (accessed August 22, 2016).

55 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices. Op. Cit.*

56 Maskus, K. E. *Op. Cit.*; Agriculture and Rural Development Department. *Op. Cit.*; Bishaw, Z. and A.J.G. van Gastel. *Op. Cit.*

57 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices. Op. Cit.*

58 GRAIN and La Via Campesina. *Seed Laws that Criminalise Farmers: Resistance and Fight Back*. 2015. https://www.grain.org/article/entries/5142-seed-laws-that-criminalise-farmers-resistance-and-fightback (accessed August 22, 2016).

59 Bwire, J. et al. *Farmer-Managed Seed Systems in Morogo and Mvomero, Tanzania: The Disregarded Wealth of Smallholder Farmers.* African Center for Biodiversity, 2016. http://acbio.org.za/wp-content/uploads/2016/08/Tanzania-Field-Report.pdf (accessed September 23, 2016).

60 Information is lacking on the seed regulation changes implemented in Vietnam.

61 USAID, Feed the Future. "Your Questions Answered about Enabling the Business of Agriculture!" *Op. Cit.*

62 Agroberichten Buitenland. "Successful Training on Plant Variety Protection and Breeder's Rights." *Nieuws & Alerts.* http://www.agroberichtenbuitenland.nl/rwanda/successful-training-on-plant-variety-protection-and-breeders-rights-in-rwanda/ (accessed August 22, 2016).

63 Republic of Rwanda. *Official Gazette n° Special 20/04/2016.* April 2016. http://media.wix.com/ugd/57dfc5_427744d5bfd041adaed2475010607527.pdf (accessed August 22, 2016).

64 *Ibid.*

65 Agroberichten Buitenland. *Op. Cit.*

66 De Schutter, O. *Op. Cit.*

67 Agroberichten Buitenland. *Op. Cit.*

68 Republic of Rwanda. *Op. Cit.*

69 De Schutter, O. *Op. Cit.*

70 Theuri, C. "Rwanda Makes Changes to Its IP Laws." *IP Karibu,* May 16, 2016. http://www.ipkaribu.com/#!Rwanda-Makes-Changes-to-its-IP-Laws/cktv/573351660cf284cf213f72c1 (accessed August 22, 2016).

71 Masinjila, N., Jones, G. and H. Swamby. *Changing Seed and Plant Variety Protection Laws in Tanzania. Implications for Farmer-Managed Seed Systems.* African Center for Biodiversity, April 2016. http://acbio.org.za/wp-content/

uploads/2016/05/Tanzania-Seed-Law-2016-overview.pdf (accessed October 19, 2016).

72 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices. Op. Cit.*

73 *Ibid.*

74 Kastler, G., Onorati, A. and B. Brac. "Seeds and Peasant Autonomy." In Bellows, A.C. et al (Eds). *Alternatives and Resistance to Policies that Generate Hunger.* Right to Food and Nutrition Watch, 2013. http://www.fian.org/fileadmin/media/publications/Watch_2013_eng_WEB_final.pdf (accessed November 28, 2016).

75 Peschard, K.E. "Farmers' Rights to Seed: Conflicts in International Legal Regimes." In Bellows, A.C. et al (Eds). *Keeping Seeds in Peoples' Hands. Op. Cit.*

76 La Via Campesina. "The Seed Treaty Undermined by the Gangrene of Biopiracy." [Press Release], October 15, 2015. https://viacampesina.org/en/index.php/main-issues-mainmenu-27/biodiversity-and-genetic-resources-mainmenu-37/1886-the-seed-treaty-undermined-by-the-gangrene-of-biopiracy (accessed November 28, 2016).

77 Bordoni, P. et al. *Climate Change and Indigenous Communities: Strengthening Adaptability, Resilience, and Innovation.* Bioversity International, 2011. http://agrobiodiversityplatform.org/climatechange/files/2012/10/TCF-Phase-II-Final-Report_web.pdf (accessed October 19, 2016).

78 Bioversity International. *Seeds for Needs.* [Facsheet], undated. http://www.bioversityinternational.org/fileadmin/user_upload/research/research_portfolio/Adaptation_to_climate_change/Seeds4Needs_factsheets/Seeds_for_Needs_Overview_080415.pdf (accessed October 19, 2016).

79 Native Seed Network. *Glossary.* http://www.nativeseednetwork.org/article_view?id=13 (accessed October 19, 2016).

80 Rabara, R.C. et al. "Phenotypic Diversity of Farmers' Traditional Rice Varieties in the Philippines." *Agronomy* 4 (2014): 217-241.

81 India is the largest producer of pearl millet worldwide and Rajasthan produces over half of the country's output, but the state's productivity levels are among the lowest in the nation due to drought and low performance of hybrids and other "improved" varieties. See: Bonham, C. *Improving Food Security by Linking Genebanks to Farmers Through the Direct Release of Targeted Landrace Varieties.* Hunger Center, 2011. http://www.hungercenter.org/wp-content/uploads/2011/09/Improving-Food-Security-by-Linking-Gene-Banks-Bonham1.pdf (accessed August 29, 2016).

82 *Ibid.*

83 Gewin, V. "Crop Gene Banks are Preserving the Future of Agriculture. But Who's Preserving Them?" *Ensia,* May 21, 2015. http://ensia.com/features/crop-gene-banks-are-preserving-the-future-of-agriculture-but-whos-preserving-them/ (accessed August 22, 2016).

84 This is because farmer varieties do not meet the requirements of uniformity and stability for formal seed registration and certification procedures. See: De Schutter, O. *Op. Cit.*

85 Nilsson, M. "The In- and Out-Licensing of Plant Varieties." In Krattiger, A. et al (Eds). *Intellectual Property Management in Health and Agricultural Innovation: A Handbook of Best Practices.* Davis: PIPRA, 2007. http://www.iphandbook.org/handbook/chPDFs/ch11/ipHandbook-Ch%2011%2003%20Nilsson%20Plant%20Variety%20Licensing.pdf (accessed August 22, 2016).

86 UPOV. *International Convention for the Protection of New Varieties of Plant.* March 1991. http://www.upov.int/upovlex/en/conventions/1991/act1991.html#_15 (accessed August 30, 2016).

87 Cullet, P. *Plant Variety Protection.* [Briefing Paper], IELRC, 2003-2004. http://www.ielrc.org/content/fo304.htm (accessed September 23, 2016).

88 APREBES. "UPOV Convention." *Plant Variety Protection.* http://www.apbrebes.org/content/upov-convention (accessed August 22, 2016).

89 National Sustainable Agriculture Coalition. "Seeds & Breeds Summit Proceedings." [Distilled Summary], October 2014. http://sustainableagriculture.net/wp-content/uploads/2014/10/NSAC-Seeds-and-Breeds-Proceedings-Summary.pdf (accessed August 22, 2016); Midwest Sustainable Agriculture Working Group & the Sustainable Agriculture Coalition. *Op. Cit.*

90 Wattnem, T. "Seed laws, certification and standardization: outlawing informal seed systems in the Global South." *The Journal of Peasant Studies* 43.1 (2016): 1-18.

91 *Ibid;* GRAIN and La Via Campesina. *Op. Cit.*

92 GRAIN. "Infographic: Seed Laws Around the World. (Database)." *Publication.* https://www.grain.org/article/entries/5153-infographic-seed-laws-around-the-world (accessed August 22, 2016); Wattnem, T. *Op. Cit.*

93 *Ibid;* Kastler, G. *Seed Laws in Europe: Locking Farmers Out.* GRAIN, 2005. https://www.grain.org/article/entries/541-seed-laws-in-europe-locking-farmers-out (accessed August 22, 2016).

94 African Center for Biodiversity. "Harmonisation of Africa's Seed Laws Through SADC and COMESA." [Poster], 2016. http://acbio.org.za/wp-content/uploads/2016/08/SADC-COMESA-Eng.pdf (accessed August 22, 2016).

95 SADC Seed Center. *SADC Seed Varity Catalogue.* http://sadcseedcentre.org/index.php/catalog (accessed August 22, 2016); COMESA. *Variety Catalogue Database.* https://varietycatalogue.comesa.int/web/varietycatalogue (accessed August 22, 2016); Jones, G. *Op. Cit.*

96 *Ibid;* Global Alliance for the Future of Food. *Background Note on Seed Harmonisation in Africa.* (Undated). http://futureoffood.org/pdfs/EDGE_Background_Note_on_Seed_Harmonisation.pdf (accessed August 31, 2016).

97 Pschorn-Strauss, E. "African Food Sovereignty: Valuing Women and the Seed They Keep." In Bellows, A.C. et al (Eds).). *Keeping Seeds in Peoples' Hands. Op. Cit.*

98 *Ibid.*

99 World Bank Group. *Enabling the Business of Agriculture 2016. Comparing Regulatory Good Practices. Op. Cit.*

100 Fuglie, K., Heisey, P., King, J., and D. Schimmelpfennig. *Op. Cit.*

101 FAO. *Building a common vision for sustainable food and agriculture.* Rome, 2014. http://www.fao.org/3/a-i3940e.pdf (accessed November 8, 2016).

102 Maass Wolfenson, K.D. *Coping With the Food and Agriculture Challenge: Smallholders' Agenda.* Food and Agriculture Organization of the United Nations, July 2013. http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Coping_with_food_and_agriculture_challenge__Smallholder_s_agenda_Final.pdf (accessed September 23, 2016).

103 Carletto, C., Savastano, S. and A. Zezza. "Fact or Artifact: The Impact of Measurement Errors on the Farm Size–Productivity Relationship." *Journal of Development Economics* 103 (2013): 254-261.

104 Oakland Institute. *Protecting Biodiversity and Traditional Agro-systems in Ethiopia.* [Agroecology Case Studies], 2015. http://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/casestudy_biodiversity_Ethiopia_final.pdf (accessed September 7, 2016).

105 Mousseau, Frederic. *On Our Land: Modern Land Grabs Reversing Independence in Papua New Guinea.* Oakland Institute, 2013. http://www.oaklandinstitute.org/our-land-modern-land-grabs-reversing-independence-papua-new-guinea (accessed September 7, 2016).

106 *Ibid.*

107 GRAIN and PEAC. *Op. Cit.*

108 *Ibid.*

109 FAO Sustainable Development Department. *Op. Cit.*

110 *Ibid;* USC Canada. "Honduras" *What We Do.* http://usc-canada.org/what-we-do/seeds-of-survival/honduras, http://www.fao.org/3/a-i1070e/i1070e06.pdf (accessed August 22, 2016).

111 In 2009, nearly half of all US private seed-biotechnology research investments went to the development of corn varieties. See: Heisey, P.W. *Op. Cit.*

112 Midwest Sustainable Agriculture Working Group & the Sustainable Agriculture Coalition. *Op. Cit.*

113 *Ibid.*

114 *Ibid.*

115 Monsanto. "Monsanto Company to Acquire Seminis Inc., a Leading Vegetable and Fruit Seed Company." [Press Release], January 24, 2005. http://news.monsanto.com/press-release/monsanto-company-acquire-seminis-inc-leading-vegetable-and-fruit-seed-company (accessed September 7, 2016); Sligh, M. and L. Lauffer (Eds). *Summit Proceedings: Summit on Seeds and Breeds for 21st Century Agriculture.* Rural Advancement Foundation International, 2004. https://www.leopold.iastate.edu/files/pubs-and-papers/2003-09-summit-proceedings-seeds-breeds-21st-century-agriculture.pdf (accessed September 7, 2016).

116 Elton, S. *Consumed: Food for a Finite Planet.* Chicago: University of Chicago Press, 2013.

117 Sligh, M. and L. Lauffer (eds). *Op. Cit.*

118 World Bank. "About Enabling the Business of Agriculture." *Op. Cit.*

119 Research has shown that widely used arguments to discredit farmers' seeds as potentially unsafe and prone to diseases are unfounded. Studies find no significant differences between quality of farmer seed (in terms of health, absence of contaminants, etc.) and of industrial seed, and no evidence exists that seed recycling (saving the seeds for sowing at the next crop season) lowers quality. See: Coomes, O.T. et al. *Op. Cit.*; Louwaars, N. "Seed Laws: Biases and Bottlenecks." *GRAIN,* 2005. https://www.grain.org/article/entries/473-seed-laws-biases-and-bottlenecks (accessed August 17, 2016); Bishaw, Z. and A.J.G. van Gastel. *Op. Cit.*

120 GRAIN and La Via Campesina. *Op. Cit.;* Bishaw, Z. and A.J.G. van Gastel. *Op. Cit.*

121 Coomes, O.T. et al. *Op. Cit.*; Oakland Institute. *Seed Fairs In Post-Conflict Situations. Op. Cit.*

122 Ojiewo, C.O. et al. *Op Cit.;* Buitati, M. et al. *The Law of the Seed.* Navdanya International, 2013. http://www.navdanya.org/attachments/lawofseed.pdf (accessed August 30, 2016).

123 USC Canada. "Honduras" *Op. Cit.*, USC Canada. "Timor Leste." *What We Do.* http://usc-canada.org/what-we-do/seeds-of-survival/timor-leste (accessed August 22, 2016); Bishaw, Z. and A.J.G. van Gastel. *Op. Cit.*

124 Oakland Institute. *The Agricultural and Tree Products Program in Cameroon.* [Agroecology Case Studies], 2015. http://www.oaklandinstitute.org/sites/oaklandinstitute.org/files/Agroforestry_Cameroon.pdf (accessed September 23, 2016).

125 *Ibid.*

126 Mubangizi, E. et al. *Uganda Seed Sector Assessment*. [Briefing Note] ISSD, September 2012 http://www.issdseed.org/resource/issd-national-seed-sector-assessment-briefing-notes (accessed August 30, 2016); Ojiewo, C.O., *et al. Op. Cit.*; Oakland Institute. *Seed Fairs In Post-Conflict Situations. Op. Cit.*

127 Ojiewo, C.O. et al. *Op. Cit.*

128 *Ibid.*

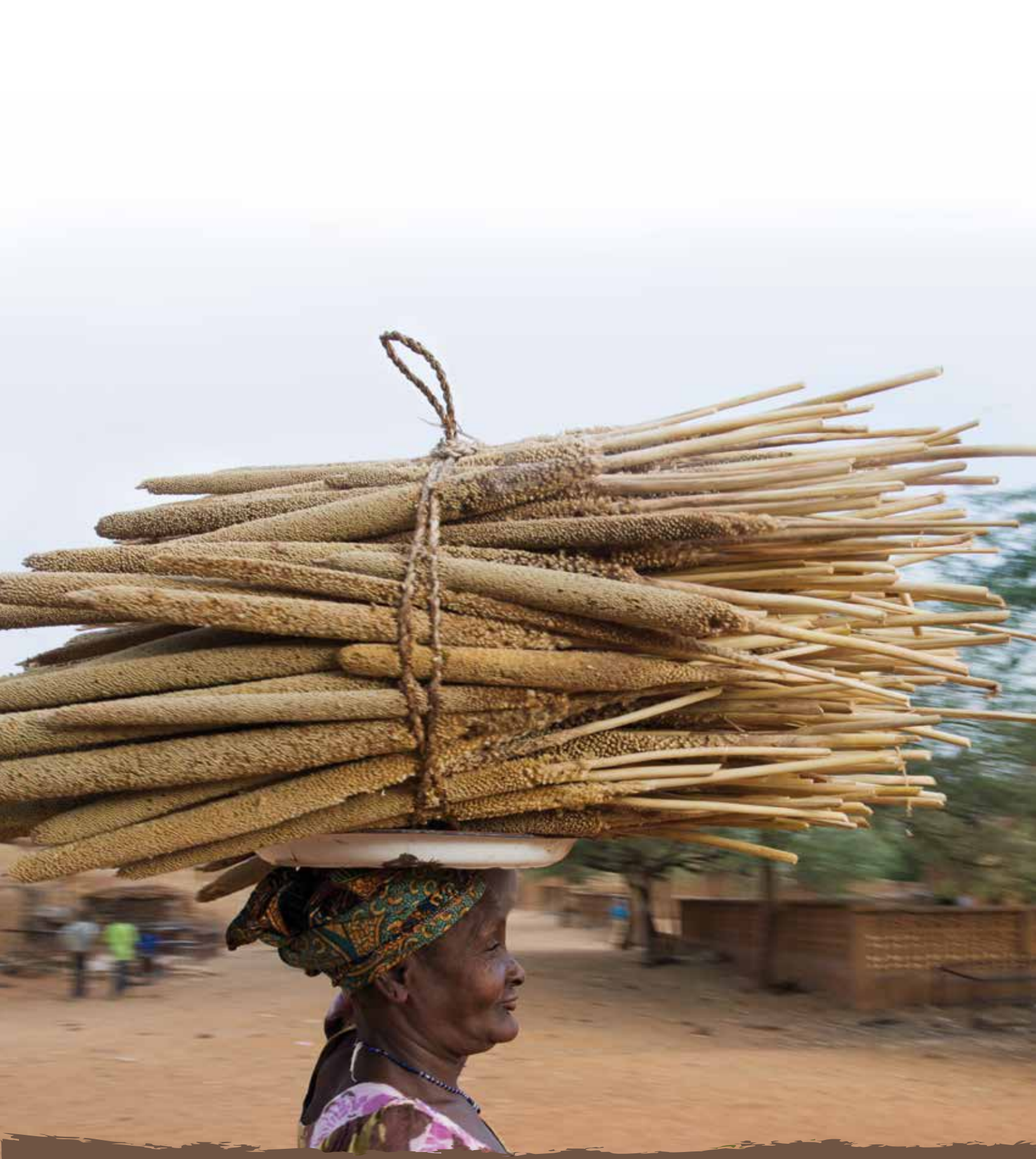
129 Oakland Institute. *Mulch and Seed Banks: Conservation Farming in Zimbabwe. Op. Cit.*

130 *Ibid.*

131 Midwest Sustainable Agriculture Working Group & the Sustainable Agriculture Coalition. *Op. Cit.;* King, J., Toole, A. and K. Fuglie. *The Complementary Roles of the Public and Private Sectors in U.S. Agricultural Research and Development.* USDA Economic Research Service, 2012. http://www.nist.gov/tpo/publications/upload/Complementary-Roles-of-the-Public-and-Private-Sectors-in-U-S-Agricultural-RandD.pdf (accessed August 22, 2016).

132 Bellows, A.C. et al (Eds). *Keeping Seeds in Peoples' Hands. Op. Cit.*; Frison, E. et al. *Op. Cit.*

133 Communication with Justine Greening, former Secretary of State, UK Department for International Development (DFID). April 2, 2016.



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