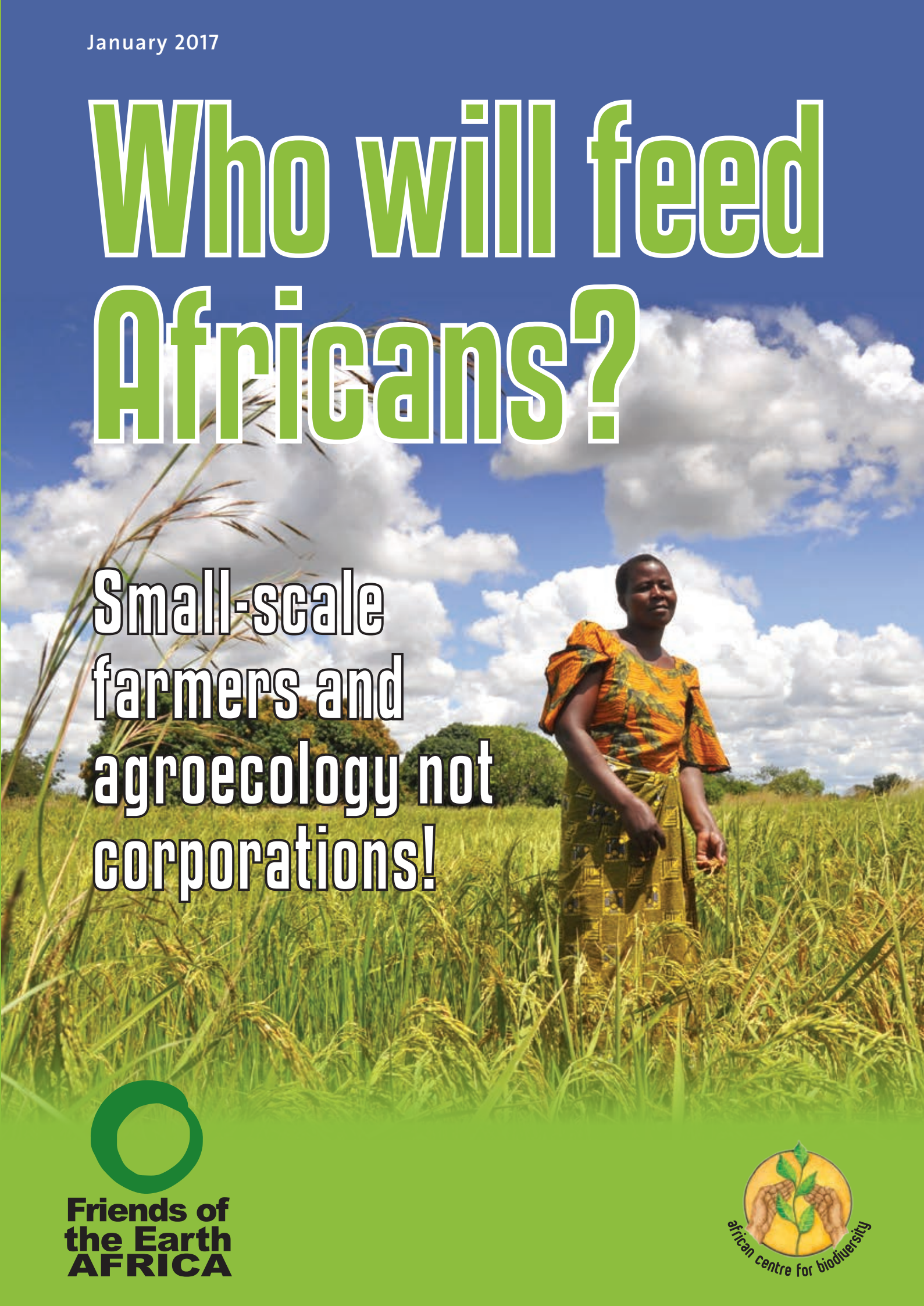
January 2017

Who will feed Africans?

Small-scale farmers and agroecology not corporations!



Friends of the Earth AFRICA

african centre for biodiversity

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The African Centre for Biodiversity (formerly, African Centre for Biosafety) (ACB) is a non-profit organisation, based in Johannesburg, South Africa. ACB carries out research, analysis and advocacy work, sharing information and engaging in dialogue to foster and promote informed engagement with policies and decision-making that impact on the production, distribution and access to food and resources. ACB's work is centred on dismantling structural inequities in food and agriculture systems in Africa and directed towards the attainment of food sovereignty.

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Commercialisation of African agriculture at a glance

The global agro-food system is currently dominated by corporate power and financialisation, shaping investment in *inter alia*, genetic engineering, seed, agrochemicals and fertilisers. This trend is fast taking root in Africa as multinational seed and agro chemical companies are establishing a presence of varying degrees in Africa. The adoption by African governments of the Green Revolution agenda in regional and national policies has provided impetus for the privatisation and corporatisation of African agriculture as has externally driven interventions by the Alliance for a Green Revolution in Africa (AGRA), the G8 New Alliance for Food Security and Nutrition (NAFSN), Grow Africa and others. Multinational seed and agro chemical companies require an enabling environment in which to operate. This includes legal changes to protect private sector investment in research and marketing, access to finance so farmers can afford to purchase their new seed varieties including genetically modified seed (and the accompanying agro-chemicals) and stable output markets (with the underlying physical infrastructure) to ensure that farmers are able to re-pay their creditors. This has involved huge investments of time and money in agricultural practices and policies concerning research, registration and marketing of seeds.

Farm input subsidy programmes (FISPs) also play a central role in financing and delivering Green Revolution technologies such as improved seed and inorganic fertilisers to farmers, and tend to secure guaranteed, subsidised markets for multinational corporations. African public resources are being channeled into establishing the conditions for private profit with highly questionable long-term benefits for producers or consumers in Africa.

The vision of the completed Green Revolution puzzle is coherent and the logic is clear: a production system in which farmers large and small have access to the latest technologies, financed through the profitable production and sale of commodities that meet the requirements of global, regional and domestic markets.

Many farmers are already being displaced by forces of competition, concentration and land grabs and are forced into poorly paid and insecure wage work in mines or factories and at worse, languishing in poverty and destitution in cities and slums. All historical and cultural connection to the land is severed by commodification and commercialisation—without any alternative livelihoods to replace what they have lost. Some local producers and businesses certainly stand to benefit from this effort, but the costs will be borne by other, less visible, people.

In Africa, more than 65 % of the population depends on agriculture for labour and livelihoods. This agriculture is almost completely rain-fed, with only about 4 % of arable land under irrigation. This agriculture produces around 80% of food consumed by African families. Most farmers struggle mightily with the high variability in rainfall and soils low in nutrients. As a result of the market and production risks of small scale farming, farmers keep a diversity of seeds that, individually, do not meet all their needs, but together ensure food security. These smallholder farmers save 60-70 % of the seed used on-farm, acquire 30-40 % from relatives and neighbours and less than 10% from the formal seed sector. Most farmers in Africa farm on less than 2 ha of arable land and in order to feed their families and produce for local markets, they need to maximise productivity, through growing a diversity of crops for different growing seasons, using intercropping systems and adapting planting to climate change. This is only possible if they have easy access to locally adapted seed at the time, in sufficient quantities suitable to particular cropping systems, soil, climatic conditions and so forth.

A paradigm shift is required for the future of food and farming systems in Africa. A clean beak is needed away from a chemical approach to a biological approach; from a Green Revolution, to an agroecological revolution; putting smallholder producers at the centre of food systems. Extensive evidence suggests agroecological farming systems can feed a growing African population, protect livelihoods and conserve and regenerate ecological resources to sustain current and future generations in Africa. This requires unblocking ideological barriers biased in favour of industrial agriculture; understanding the ways to facilitate and augment agroecological practices local and traditional knowledge systems; and reorientating and prioritisating of public goods.

The new Green Revolution: Agribusiness and corporate takeover

Support for African agriculture rose in the 2000s, following years of neglect resulting from structural adjustment programmes (SAPs) across the continent. Prior to the SAPs the public sector was the driver of agricultural development in Africa. The new wave of support – the 'new' Green Revolution – is, however, driven by private interests.

The Green Revolution push in Africa is based on the argument that Africa has huge underutilised reserves of natural resources, and that enough food needs to be produced to feed a growing and increasingly urbanised population. The response has been an emphasis on increasing yields and productivity, particularly a focus on 'flex' grain crops.[1] The foundations for this approach were laid by the Comprehensive African Agricultural Development Programme (CAADP) under the auspices of the African Union in the early 2000s. This provided a common Africa-wide framework for the modernisation and commercialisation of African agriculture. CAADP has effectively entrenched the Green Revolution agenda in subsequent years, such as through the development of regional agricultural plans, which in turn get carried into sub-regional and national agricultural policies and plans.

The formation of the Alliance for a Green Revolution in Africa (AGRA),[2] initiated and funded by the Bill and Melinda Gates and Rockefeller Foundations in 2006, was central in driving the new Green Revolution in African agriculture. AGRA's focus is on the development and dissemination of 'improved' inputs, especially seed and synthetic fertiliser, commercial markets, and institutional and legal frameworks to encourage private sector investment.

In 2009, the World Bank released a report on competitive commercial agriculture for Africa (World Bank, 2009), which sketches out the expansion of the Green Revolution in Africa, and identifies the 600 million hectare Guinea Savannah as the target, describing it as 'one of the largest underused land reserves in the world' (see Figure 2). This report has become a template for interventions by a number of coordinated Green Revolution actors, including global and African governments, research institutes and aid agencies.

There are two sides to the Green Revolution push. On the one hand, large-scale, export-oriented industrial agricultural production is promoted, including plantation crops, like cotton, sugar, and soya. Land policies are being reformed to allow governments to allocate large blocks of land on long lease (e.g. 99 years) or even for outright sale for commercial use. This is the basis of 'land grabs' that see elites benefiting at the cost of smallholder farmers.[3]

On the other hand, the Green Revolution has incorporated small-scale farmers by integrating selected small farmers into corporate value chains through contract farming, mainly for export, and providing direct support through subsidised inputs and infrastructure to facilitate economies of scale and reduce storage, marketing and distribution costs. The latter supports the growth of commercial smallholder farming, and benefits the few farmers whose landholdings increase, inevitably at the expense of others.

The logic of the Green Revolution is that farmers will pay for specially designed inputs with an expected increase in outputs, which will allow for the sale of surpluses. The income earned can then be used both to cover the cost of inputs for the next season, and for additional income for the household. In practice this circle of prosperity has not materialised. Inputs have been subsidised at great cost for many years without becoming a sustainable part of the agricultural system. Ongoing subsidy of inputs through Farm Input Subsidy Programmes (FISPs) channel scarce state resources into the pockets of multinational seed and fertiliser corporations, who receive a guaranteed market resourced from the public purse.

1. Crops that have multiple uses (food, feed, fuel, industrial material), and have the ability to be flexibly interchanged.
2. www.agra.org
3. See, for example, De Schutter, O. 2011. How not to think of land –grabbing: Three critiques of large-scale investments in farmland, *Journal of Peasant Studies* 38 (2):249–279.

Africa is a zone of expansion for multinational agribusinesses. Globally, significant corporate concentration has taken place over the past two decades, in both inputs and outputs. In 2004, the four largest grain traders – Archer Daniels Midland, Bunge, Cargill and Louis Dreyfus – already accounted for 75% of the global maize trade. Six giant agrochemical corporations – BASF, Bayer, Dow, Du Pont, Monsanto, and Syngenta – dominate commercial seed and pesticide markets. Concentration is due to increase with planned mergers of Bayer-Monsanto, Dow-Du Pont and ChemChina-Syngenta in the near future. This produces highly concentrated agricultural input markets in Africa, for example, Monsanto and Du Pont (through Pioneer Hi-Bred, its seed unit) already owns South Africa's largest seed companies. Pannar, which has a major footprint in Africa, is now a subsidiary of Pioneer Hi-Bred.

Although the FISPs do allow farmers some access to inputs, there are social and ecological problems with the input package. Synthetic fertiliser is highly damaging to the ecosystem over time. Hybrid seed may increase yields under certain conditions, but it also displaces local farmer varieties, reduces agricultural biodiversity and raises risk for farmers. Many people are excluded from access, with only a few small farmers benefitting. Vague promises of beneficiation down the line and increasing employment rarely materialise or are extremely exploitative, and cultural and social systems are broken in the process.

The shift to standardised cash crops results in the same product being sold by the majority of farmers, driving local market prices down, reducing agricultural biodiversity, increasing risk, and generating inequalities among farmers. The stringent criteria associated with external value chains make it very difficult for local farmers to participate and obtain any benefit.

The focus on research and development (R&D) of technologies and processes to meet the needs of external markets has meant the neglect of R&D efforts on local or indigenous crops and varieties, organic or agroecological soil fertility techniques and context-specific techniques and appropriate democractially managed technologies. This has implications for diversity and risk in farming systems as a whole.

Three key pillars of the new Green Revolution

1. Infrastructure: Regional industrialisation strategies have focused on agricultural value chains of standardised grain and oilseed crops, and physical infrastructure along agricultural growth corridors that are built on historic transport routes (Figure 1).

Figure 1: Growth corridors in southern Africa

Source: Rose-Innes, 2011

2. Policies and institutions: Legal and policy frameworks are being reformed to protect private investments and allow private ownership of land and other resources, including the protection of intellectual property on new plant varieties. Without these guarantees, the private sector will not invest. Policy and law-making processes have circumvented farmer and public participation, particularly regional harmonised seed and intellectual property rights laws.

3. Technical and practical support work: Ultimately the Green Revolution is about the development and dissemination of a technological package that incorporates improved (mainly hybrid) seed, synthetic fertiliser, irrigation, land consolidation, interest-based credit and commercial markets. Much effort is spent on establishing and supporting functional technical and governance structures, institutions and arrangements. This includes sponsoring the development of technical skills through universities and agricultural research institutes geared towards Green Revolution technologies, at the expense of sustainable and just agricultural development.

There are currently enormous projects unfolding on the continent, aimed at expanding the Green Revolution agenda. In 2012 the G8 launched the New Alliance for Food Security and Nutrition (NAFSN), with cooperation frameworks in 10 African countries.[4] The objective of NAFSN is to create the conditions for private sector – particularly corporate – involvement in African agricultural development. Although the country frameworks vary, there are a number of commonalities: laws are introduced protecting investor assets, including in plant breeding; individual land titles and large-scale land concessions are given for commercial agricultural development as a step to privatisation; and regional regulations are harmonised to enable easier movement of capital and goods. The United States Agency for International Development (USAID)'s agriculture support programme, Feed the Future, operates in 12 African countries,[5] also mapping neatly onto the World Bank's template. AGRA works in 17 countries in the Guinea Savannah, with a focus on 'breadbasket areas' in the agricultural corridors, where the emphasis is on sites with fertile land, water and existing infrastructure.

Figure 2: Map of the Guinea Savannah and countries where NAFSN, USAID and AGRA operate.

Philanthro-capitalist foundations such as BMGF, Rockefeller, Buffet, Lundin, Clinton and others play a significant role providing resources and shaping the development agenda to meet their own interests. In 2016, the Bill and Melinda Gates Foundation (BMGF) estimated that US$30 billion has been committed across the board by all actors over the next 5 years to advance this vision of African agriculture.

Investment in African agriculture is important, but the nature of this investment cannot be underestimated. Those driving the 'new' Green Revolution do so in their own worldview, and often at others' expense. The shift from public to private investment in R&D has implications for agricultural, institutional and governance landscapes, with massive implications and particularly for the social and ecological well-being of African agriculture.

The GM push in Africa

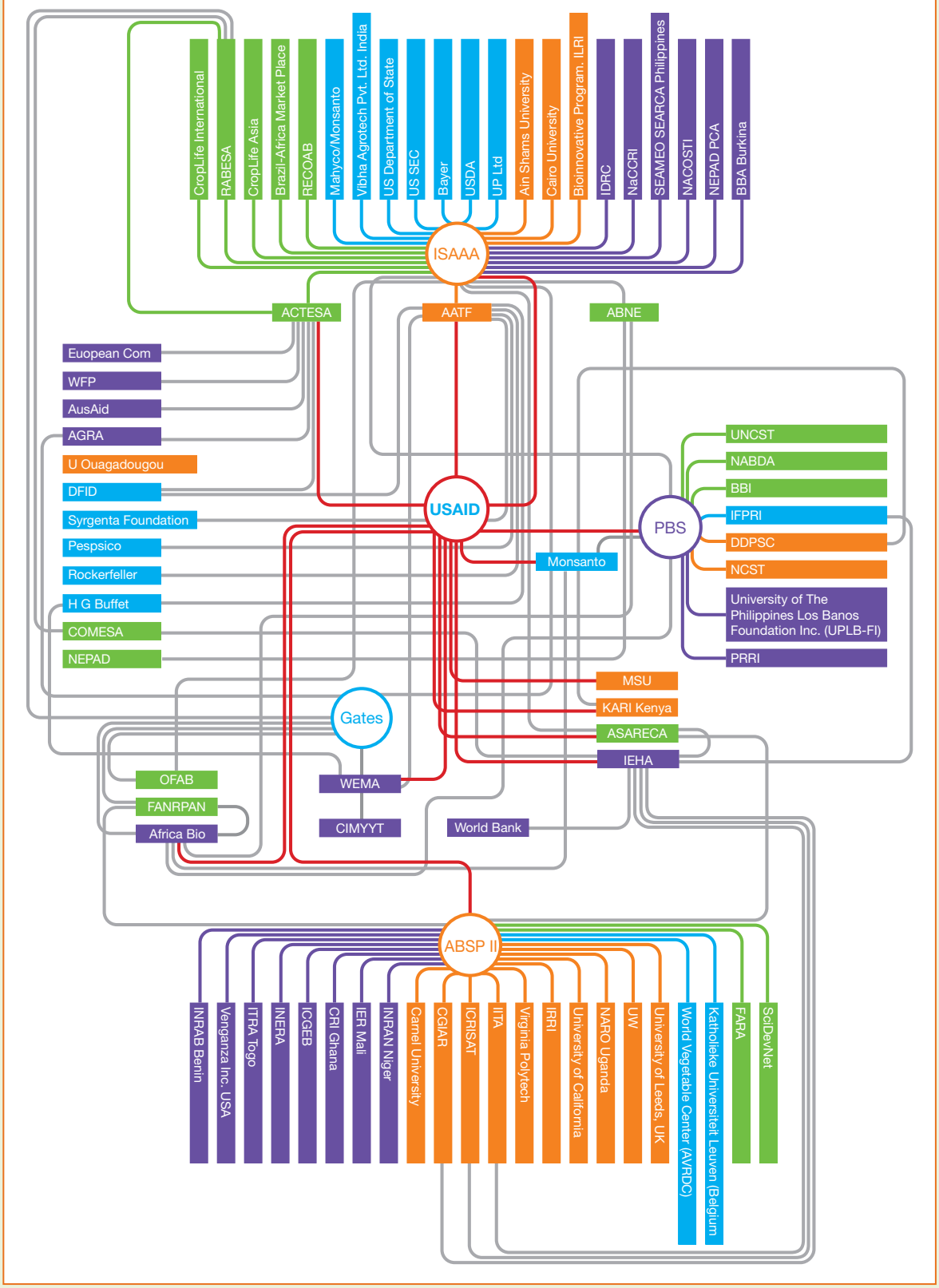
Currently South Africa, Sudan and Burkina Faso are the only countries on the continent growing GM crops commercially. South Africa is the only country growing GM staple food (maize), with Burkina Faso and Sudan growing (Bt) insect resistant cotton (although Burkina Faso is phasing this out). In the rest of Southern and East Africa, under the guise of addressing the challenges posed by climate change, nutrition deficiencies, urbanisation and population growth, various players of foreign agribusiness, and particularly the biotech industry are redoubling their efforts to introduce GM crops into the rest of the continent and to reshape Africa's agricultural and biosafety policy environment.

There is a plethora of players and projects involved in promoting the uptake of GM crops on the continent. USAID, in particular, has funded capacity building, technology transfer and infrastructural development through an intricate network of institutions and programmes and has, in many instances, assisted with the founding of new African bodies to oversee biosafety policy development, technical guidelines and GM public

4. Benin, Burkina Faso, Ethiopia, Ghana, Ivory Coast, Malawi, Mozambique, Nigeria, Senegal, Tanzania.
5. Ethiopia, Ghana, Kenya, Liberia, Malawi, Mali, Mozambique, Rwanda, Senegal, Tanzania, Uganda, Zambia. See https://www.feedthefuture.gov/countries

relations. This is evident in key programmes funded by USAID, including the Agricultural Biosafety Support Project and the Programme for Biosafety Systems, the International Service for the Acquisition of Agri-biotech Applications, African Biosafety Network of Experts, Open Forum on Agricultural Biotechnology in Africa and African Agricultural Technology Foundation, to name a few. USAID has also supported the development of harmonised biosafety policies within Regional Economic Communities to promote expedited and seamless regional trade in GM seeds and grains, which is already the case with the Common Market for eastern and southern Africa.

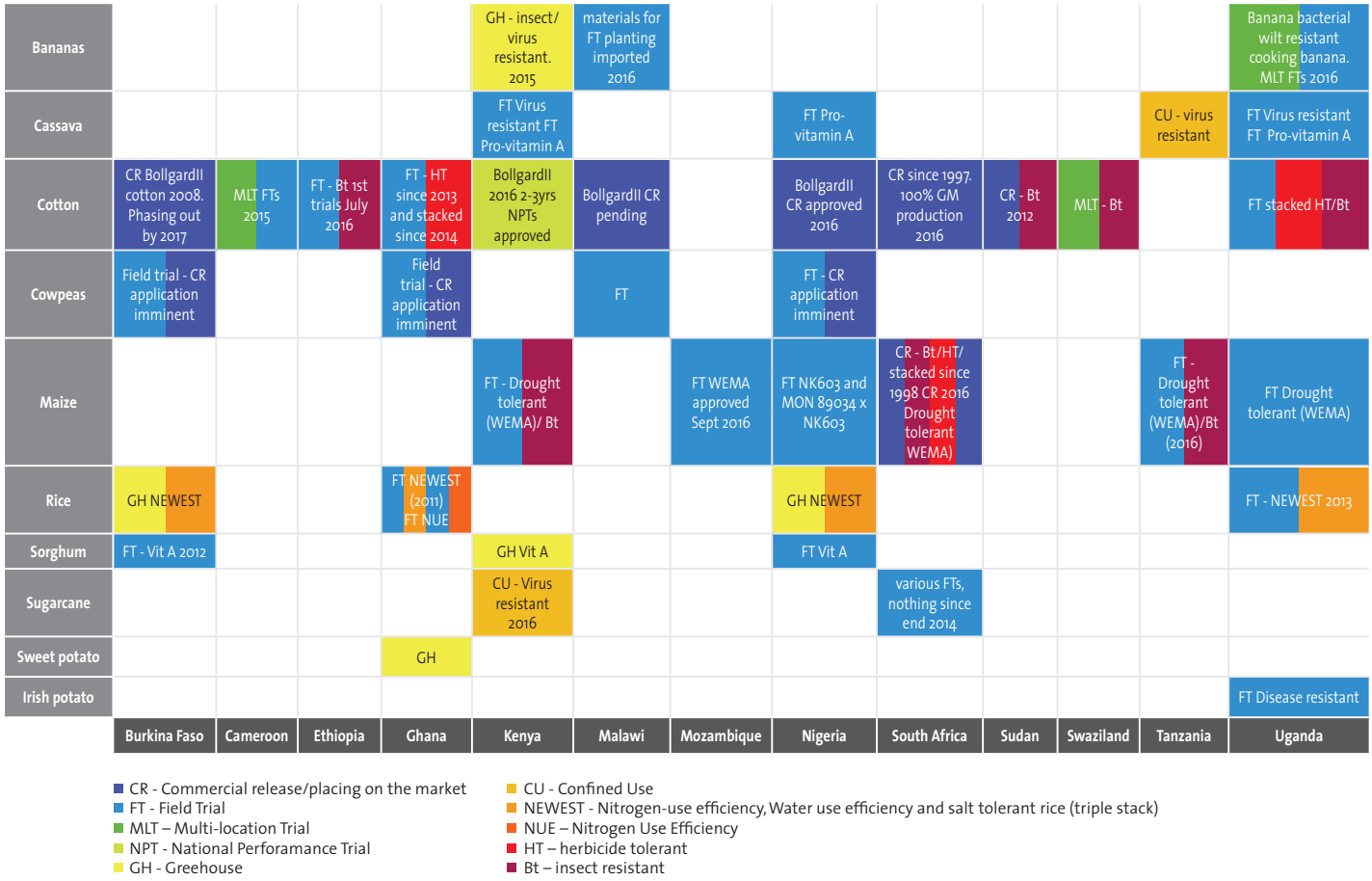
Figure 3: Web of actors in pushing GM crops in Africa



The BMGF has also been instrumental in funding both policy interventions and scientific projects, particularly on indigenous crops. R&D geared towards genetically modifying indigenous/ traditional crops, such as cowpea, pigeon pea, sorghum, cassava and banana. This has been a strong tool to transfer technology to local scientists, develop risk assessment and other regulatory procedures and win over lobbying power in scientific and government circles (ACB, 2016).

Meanwhile, agribusiness corporations have entered into public-private partnerships to promote the adoption of GM crops. For example, Monsanto has 'donated' it's off-patent and outdated Bt technology (MON 810) and a questionable drought tolerant trait through the Water Efficient Maize for Africa (WEMA) project; the same throwaway Bt technology is used to develop GM cowpeas; the DuPont Business Foundation is the principal technology donor of the African Biofortified Sorghum project aimed at increasing levels of essential nutrients in sorghum; Pioneer Hi-Bred is involved in R&D on GM sorghum in Kenya and Burkina Faso; and Arcadia Biosciences gave the African Agricultural Technology Foundation (AATF) a cost-free license granting access to Arcadia's nitrogen use efficiency, water efficiency and salt tolerance technologies, to develop NEWEST rice (ACB, 2016).

Figure 4: The status of GM crops in African countries



Disclaimer: Reliable and up-to-date information on GM activities is notoriously hard to come by, this may not be an exhaustive list and in some cases experiments or trials listed may have been discontinued. This list serves as a guideline.

The GM cotton push

GM cotton has been produced globally for almost two decades, yet up to now only three African countries have grown GM cotton on a commercial basis: South Africa since 1997, Burkina Faso since 2008 and Sudan since 2012. In 2016 Nigeria approved the commercial release of Monsanto's Bt cotton (Bollgard II) but it is yet to be made available on the market, while in Malawi Monsanto has a GM commercial release application pending. Ghana and Kenya are in advanced stages of field trials of Bt cotton and Kenya has approved national performance trials of Bollgard II to run for the next for 2–3 years before approving their commercial release. Cameroon, where field trials have been underway for some time, has amended its biosafety regulations in preparation for commercial release of cotton, while even countries that have historically taken very cautious approaches to GMOs in the past are now entering the fray – field trials have begun in Ethiopia while Zambia is relaxing their biosafety laws in preparation for experimentation with GM cotton.

Since the adoption of Bt cotton in Burkina Faso, Monsanto has boasted about the benefits of their technology for smallholders. However, in 2015 the Burkina Faso cotton industry officially announced that they will phase out Monsanto's cotton by 2017, citing inferior quality lint produced by Bt varieties, which have fetched lower prices on international markets and undermined the reputation of high quality Burkinabe lint (Dowd-Uribe and Schnurr, 2016). Burkina Faso's cotton industry is now seeking US$84 million in damages from Monsanto (Bonkoungou, 2016). The industry may, however, entertain GM cotton from other players, such as Bayer, should the opportunity arise. Bayer is, however in the process of acquiring Monsanto.

Water Efficient Maize for Africa (WEMA) Project – offering a false solution

Water Efficient Maize for Africa (WEMA) is a Monsanto/BMGF project. Other key project partners include the Howard Buffet Foundation, USAID and the International Maize and Wheat Improvement Centre. WEMA is being implemented in South Africa, Kenya, Uganda, Tanzania and Mozambique, and offers the GM drought tolerant maize to smallholder farmers in Africa as a 'climate smart' solution to abiotic stresses, such as drought. So far, US$85 million has been injected into the WEMA project, while Monsanto has 'donated' its drought-tolerant technology – a single gene that is supposed to confer drought tolerance, its insect resistant Bt gene (MON810) and technical expertise. The MON810 (Cry1Ab) 'donated' by Monsanto to WEMA is an old throw-away technology, now discontinued in South Africa, where massive pest resistance is widely reported. WEMA is also developing conventional drought tolerant varieties.

Impending threat: GM takeover of traditional crops

There is a great deal of research and development currently underway into the genetic modification of African traditional crops, such as cowpea, cassava, sorghum, sweet potato, pigeon pea and millet. Most of the ongoing trials are focused on drought and salt tolerance, nitrogen use efficiency, resistance to tropical pests and diseases and nutritional enhancement (biofortification). The key targeted countries include Burkina Faso, Egypt, Ghana, Nigeria, Kenya, Uganda and Malawi.

The AATF is spearheading a project funded by USAID, the United Kingdom's Department for International Development and the Rockefeller Foundation to develop a cowpea resistant to the legume pod borer, *Maruca vitrata*, with Monsanto providing technical assistance and donating its Cry1AB gene. In many countries, Bt cowpea, which is resistant to the legume pod borer is being pushed for commercial release. These efforts are meeting with much resistance from African social movements, who are determined to keep cowpea out of the clutches of agribusiness. This precious indigenous crop is crucial to food security because it is available in the hungry season and provides a cheap and accessible source of protein (ACB, 2015b).

The WEMA project has proven to be an excellent vehicle to influence policymakers in the participating countries to relax biosafety and strict liability related legislation and gain acceptance for a GM staple food. For example, Tanzania and Mozambique have amended their strict liability laws, due to pressure from WEMA. The extensive and devastating drought experienced across the region in 2016 has also hugely strengthened the biotech industry's argument that the technology

is urgently needed through the introduction of GM drought tolerant maize. South Africa approved the commercial release of GM drought tolerant maize in 2016, despite widespread objections.

WEMA field trials began in Kenya and Uganda in late 2010, while Tanzania and Mozambique have approved field trials in 2016.

Agroecology and food sovereignty

Agroecology is an interdisciplinary science: an agricultural approach embedded in ecological principles. Agroecology is an ecosystem-based approach to agriculture that aims to increase both the resilience and sustainability of agroecosystems and provide the principles for farming communities to obtain food, energy and technological sovereignty (Altieri, 2012). It integrates social practices grounded in local empowerment and knowledge generation. This recognition of the political economy of food production and consumption is expressed as food sovereignty, and goes beyond the availability of food to ensuring access and the right to food (Altieri and Toledo, 2011).

As a set of farming practices, as well as a broader social movement, agroecology focuses on the social, economic and political dynamics that shape food production and local knowledge. It builds farmer capacity to innovate and integrate technical practices that draw on ecological principles (Bezner-Kerr et al, 2016). The labour intensive nature of agroecology makes it ideal for job creation and increasing on-farm employment (Parmentier, 2014).

Yilou, Burkina Faso, sorghum production
Photographer Georges Félix

Finding suitable solutions for African agriculture

Why small-scale farmers are integral to feeding the African population

Small-scale farmers are the backbone of agricultural production worldwide, and particularly in sub-Saharan Africa. Africa has about 33 million small farmers, representing 80% of all farmers in the region, and many of them are women. Small-scale farmers produce 80% of food consumed in Africa, on less than 15% of available land (HLPE, 2013). These farmers conserve landraces under precarious conditions. Two-thirds of all farms are smaller than 2 hectares, and 90% of farms are smaller than 10 hectares. However, a powerful international push for industrial modes of agriculture in Africa threatens to displace small-scale farmers and the agricultural biodiversity and cultural diversity they carry.

African traditional small-scale agriculture has fed populations for centuries. It is vital that small-scale farmers are strengthened with new approaches to food production, processing and access systems that support agroecological practices. Livelihoods must be secured so that small farmers can produce food that is safe, adequate and nutritious for a growing and urbanising society. Most climate models predict that climate change will impact regions of small-scale farmers the hardest, particularly rain-fed agriculture in the developing world. Small farms farming agroecologically will remain more resilient to climate change.

Transitioning towards agroecology for ecological sustainability, social justice and nutrition security

In order to meet future food needs, it is not sufficient to increase production. The current chemical-input approach to agriculture that has dominated the agricultural discourse, policy and practice since the 1960s must be urgently replaced with a biological approach. Extensive evidence suggests agroecological farming systems are needed to feed a growing world population, protect livelihoods and preserve and regenerate ecological resources to sustain future generations, in both developed and developing countries (Cook et al, 2016).

In this section, we draw on the experiences from parts of Africa that illustrate how agroecology is being used in local contexts, and being amplified as the most viable and necessary option for the future of agriculture.

1. Malawi – soil fertility intercropping and agroforestry
Since Malawi's independence, various government regimes have promoted agricultural modernisation. This has often taken the form of hybrid maize seed and fertiliser subsidies, and is currently being pushed through FISPs. Maize makes up the majority of Malawian diet, owing to the aggressive agricultural development policies over the last 50 years. Despite the increase in maize yields, food insecurity remains high throughout Malawi, with its population of 16.4 million people – 80% of whom live in rural areas and rely on agriculture for their livelihoods (Bezner-Kerr et al, 2016). Deeply entrenched gender inequalities continue, including lack of access to land, labour divisions, and domestic violence.

After three decades of fertiliser use, the Soils, Food and Healthy Communities project was established in 2000 to enrich the severely degraded soil through agroecological techniques and reviving indigenous methods, such as intercropping with legumes (Bezner-Kerr et al, 2016). Intercropping both improved the soil, through nitrogen fixation, and contributed to better diets. Following core principles of agroecology, the project drew on farmer knowledge, fostered farmer experimentation and innovation and farm diversification, and supported food sovereignty and resilience. This project evolved into the Malawi Farmer-to-Farmer Agroecology Project in 2012.

In other examples in Malawi, which used agroforestry techniques, maize yields increased and farm input costs were lowered, with broad socio-economic, health, and environmental benefits (Watts and Williamson, 2015). In one case, average net income from farming maize in an agroforestry system was 64% higher than the average income from farming maize using chemical fertilisers (Watts and Williamson, 2015).

2. West Africa: Organic Cotton and diversified farming
In West Africa,[6] there has been a shift to organic cotton production, for example, through the Organisation for the Promotion of Organic Agriculture in Benin (OBEPAB), a farmer organisation that works with some of the oldest, most consistent cotton suppliers in the world.

The feasibility of organic cotton production was demonstrated through a farmer field school approach, which showed that, despite an average decrease in yield, the lowered production costs have significant economic benefits, following a 2–3 year transition period. By improving the soil fertility, farmer knowledge and experience, and increasing diversified farming, there is much higher farm output and greater food production, while producing cotton. This improves food availability and security, and the overall health and safety of cotton farming. The reduced debt of poor farmers – particularly women – lowers risk and vulnerability of small-scale farmers at the bottom end of the global agriculture value chain. An agroecological revolution can thus benefit a diversity of actors in a new value cycle.

3. Kenya: Controlling pests and weeds – the push-pull techniques
In Kenya, the adoption of agroecological methods has increased maize yields (Watts and Williamson, 2015). Using simple techniques, such as the push-pull technique for pest and weed management[7] resulted in reduced use of chemical pesticides. Push-pull farmers increased their incomes to three times higher than those of conventional farmers, with increased yields and lower production costs (Curtis, 2015). Farmers that adopted the push-pull technique completely stopped using pesticides.

This simple technique has the potential to dramatically reduce dependency on external inputs, which displaces the role of the corporations and creates space for investment in sustainable solutions to the food crisis. In the face of climate change, with increasing environmental stresses and disasters and growing energy concerns, more resilient agroecosystems are required that support food and energy sovereignty, and the removal of fossil-fuel agrochemicals is critically important.

Women farmers benefit considerably from agroecological techniques. Women's yields were higher than those of their male counterparts, and higher than yields of those relying on chemical inputs. Women – bearers of traditional knowledge, seed custodianship, and biodiversity conservation – benefit the most by adopting agroecology, due to their disproportionate difficulty in accessing external inputs or subsidies.

Policy reforms to support and promote agroecological solutions

Agroecology needs to become the centre of the approach to agriculture in Africa. In order to achieve this, what policies support agroecological practices, and where can motivation for increased interest and investment be gained?

Public policies can increase areas cultivated under agroecolological methods, and create an enabling environment for farmers (De Schutter, 2010). No matter what approach is taken, public goods (such as extension services, storage facilities, rural infrastructure, market and insurance access, agricultural research and development, education, farmer and cooperative support) must be prioritised over private goods that require subsidisation (certified seeds, fertilisers/ pesticides).

There are three key processes to developing such policy revolution (Watts and Williamson, 2015). First it is necessary to **unblock ideological barriers**, particularly the entrenched beliefs that large monoculture and industrially managed systems are more productive than diversified, small-sized agricultural systems (despite contrary evidence), and that synthetic chemical inputs are indispensible.. This includes the need to work

6. This section draws on Watts and Williamson, 2015.
7. The push-pull technique is a biological pest and weed management approach intercropping plants that repel – or push – and attract – or pull – pests, and controls weeds.

across government departments and disciplines, including environment, agriculture, biodiversity, climate change, rural development, food security, nutrition, health, education, science, technology, research, gender, foreign policy and trade. The reorienting of intellectual property regimes is required in order to protect farmers, and farmer managed seed systems, rather than support the privatisation of seed resources – transferring ownership to commercial interests, and criminalising farmers for seed saving and trade.

A further second step requires **enhancing the understanding of the best ways and tools to facilitate and augment agroecological practices**, including farmer-to-farmer knowledge and skills transfer, farmers learning in their own fields, farmer-scientist collaborations and prioritising ecological agriculture extension activities. The promotion of new skills and appropriate non-patented technologies among all farming communities is crucial. This includes integrating traditional and local knowledge into the design of curricula and improving collaborations between public research institutions and education facilities. Agroecology is knowledge intensive. Therefore governments must invest in agricultural knowledge – providing support for participatory and collaborative research on farmer experiences; offering extension services; improving small farm profitability; and supporting farmer networks, farmer field schools, farmer and scientist research circles; and farmer-managed seed systems.

A third step includes the **scaling up** (creating an enabling environment for farmers to achieve agroecology) and **scaling out** (outward reach of farmers through farmer networks and more land being used for agroecology) through policies, programmes, legislation, and resource allocation.

Policies must be developed in a democratic manner involving meaningful farmer and public participation. Already social movements in Africa are supporting agroecological farming approaches that integrate, strengthen and validate farmers' seed systems.

Policies must focus on human health and nutrition – and break with the use of agrochemicals and other hazardous materials.. Greater regulation and phasing out of unhealthy, processed foods are required, and a shift towards providing incentives for the marketing of fresh, indigenous and local produce that can improve micronutrient intake (IAASTD, 2008). Public health education programmes should create awareness of the benefits of diverse nutritional consumption.

A supportive economic environment needs to be created that protects farmers from volatile commodity prices and dumping of subsidised products, and ensures transparent price formation. Focus should shift from an export-oriented economy to strengthening local food systems, and preventing global food chain dominance in local markets. Subsidies must shift from agrochemical inputs to agroecology, and there should be increased taxes on carbon production, agrochemical use and water pollution. Increased public investment must be encouraged. Secure and equitable land tenure and access to land, germplasm, and other resources are indispensable. Foreign assistance programmes must respond to locally determined priorities and support efforts to organise cooperatives and institutions controlled by local small-scale producers and their communities.

Yilou, Burkina Faso, sorghum production
Photographer Georges Félix

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