False Promises:

The Alliance for a Green Revolution in Africa (AGRA)

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Preface

Since early 2020, the Covid-19 pandemic has put the world into a state of emergency. By the end of May, around 2.6 billion people had been confined to their homes to slow the spread of the Covid-19 virus. It has quickly become obvious that social inequality is on the increase, and that the most marginalized suffer most from the crisis and its associated containment measures, especially in the Global South. Curfews, school closures, loss of earnings for day labourers, and closed borders that do not allow migrant workers to carry out their work are only some of the reasons which result in more people no longer being able to provide for themselves and their families. A global food crisis seems to be inevitable. Forecasts are shocking: the World Food Programme (WFP) expects the number of people affected by acute hunger to double by the end of the year—from 135 million to around 270 million people.[2]

While most governments focus on leaving commercial supermarkets open, local markets—which in many countries of the Global South ensure a large part of a country's food supply—are closed, and access roads are blocked. In at least 33 African countries, government measures prevented farmers from transporting food to markets or threatened food distribution. This way people are denied fresh produce—especially for those who cannot afford to shop in supermarkets. The situation is extremely severe for the urban poor who depend on casual jobs which are limited now. Families have to cut down basic expenses immensely. Long-term restrictions on movement could force farmers to abandon farms, sell off livestock to cope with lost income, or take other measures that heavily undermine long-term livelihood strategies.

The current situation vividly illustrates the need for a paradigm shift in agriculture, and for our global food system to secure the right to food for all. Instead of an over-exploitation of nature we need diversified, agroecological systems that reconcile economic, environmental, and social factors and are rooted in a territory-based approach. The publishers of this paper see it as imperative that the current pandemic is understood by governments across the world as a common, global policy task to initiate a serious transformation of our agricultural and food system in order to end hunger. Solutions should be found and coordinated within the Committee on World Food Security (CFS).

In December 2019, Agnes Kalibata, who is president of AGRA (Alliance for a Green Revolution in Africa), was appointed by United Nations Secretary-General António Guterres as Special Envoy for the 2021 Food Systems Summit.[3] In the official letter announcing her appointment, it is taken as a given that AGRA ensures "a food secure and prosperous Africa through rapid, inclusive, sustainable agricultural growth, improving the productivity and livelihoods of millions of smallholder farmers in Africa".[4] It is one of the many promises AGRA representatives have made since the intiative's beginning in 2006.

Also regarding the Covid-19 crisis, AGRA has not remained silent. In a position paper it is calling upon African governments to maintain the current systems around agricultural production. A special focus lies on the supply of seed and synthetic fertilizer, which should be maintained despite the lockdowns or curfews. On the question of how local markets—especially local food systems and alternative production models such as agroecology—can be strengthened to handle the crisis, the paper says nothing.[5] AGRA rather keeps on promoting the one-dimensional, input-intensive and resource-intensive agricultural system and global supply chains that already made many small-scale food producers dependent on external supplies of hybrid seed (instead of breeding and multiplying their own).

Hunger affects above all the poorest and most vulnerable in a society. It remains in doubt as to whether, if this path is pursued, the groups for whom the right to food is most at risk will really be heard. The first official message from Kalibata as a special envoy does not even mention civil society or marginalized groups, thus echoing the long history of their discrimination.[6] All of this makes it urgently necessary to have a deeper look at the measures AGRA has taken since 2006. This present study reveals the false promises that come with AGRA, and unpacks some basic flaws of their development approach in rural Africa.

Executive Summary

In 2006, the Bill and Melinda Gates Foundation and the Rockefeller Foundation launched the Alliance for a Green Revolution in Africa (AGRA). Armed with high-yield commercial seeds, synthetic fertilizers, and pesticides, it was touted as being able to deliver Africa its own Green Revolution in crop production to reduce hunger and poverty. Therefore, AGRA funds various projects, and lobbies African governments for the development of policies and market structures that promote the adoption of Green Revolution technology packages. Its current strategy lists "Policy and Advocacy" as its first programme, which actively pushes policies that open the doors to Green Revolution inputs, including seeds and pesticides, and prevents alternative approaches such as agroecology from receiving support.

Since the start, AGRA received contributions of nearly USD-$1 billion, the highest being from the Bill and Melinda Gates Foundation, but also from the United States, United Kingdom, and other countries including Germany. AGRA issued grants of more than USD-$500 million to promote its vision of a "modernized" African agriculture, freed from limited technology and low yields. In addition, large outlays from African governments bolstered the campaign in the form of input subsidy programmes (FISPs) to farmers to buy the mostly hybrid seeds and synthetic fertilizers AGRA promotes. The subsidies for small-scale food producers thus provided a direct incentive for the introduction of AGRA's Green Revolution technology package. Ten out of AGRA's 13 focus countries have seen significant adoption of FISPs. Under the leadership of former UN Secretary General Kofi Annan, AGRA's initial goals were to double incomes for 20 million small-scale farming households by 2020 while halving food insecurity in 20 countries through productivity improvements.[7] Over time the goals became more specific and ambitious: "to double yields and incomes for 30 million farming households by 2020."[8] AGRA deleted these goals in June 2020 from its website without giving any explanation. After 14 years in operation, AGRA is nearing its self-declared deadline. How well has its Green Revolution fared?

Despite the huge funding and resources involved, particularly contributions from governments where taxpayers' money was used to further this initiative, AGRA fails to be accountable. It has not published an overall evaluation of the impact of its programmes. It presents no reliable estimates of the number of small-scale food producer households reached, improvements in their yields, household net incomes or food security, or its progress in achieving its own ambitious goals. Similarly, the Bill and Melinda Gates Foundation, which provided more than half of AGRA's funding, remains silent. This lack of accountability and oversight is astounding for a programme that drove the region's agricultural development policies with its narrative of technology-driven input-intensive[9] methods for so long. AGRA declined requests from Tufts researchers to provide any data from its own internal monitoring and outcomes evaluation processes.

This report has a twofold approach to making up for the lack of data from within AGRA: on the one hand it fills the accountability gap and presents data on AGRA's direct beneficiaries and programme impacts to check if AGRA has reached its own goals. On the other hand, the report shows why the AGRA approach itself is the main reason it will not contribute to achieving the UN Sustainable Development Goals (SDGs), in particular to end hunger (goal number two). The report is based on a study by Tufts University researchers, who used national-level data from the 13 AGRA main target countries on production, yield, and area harvested for most of the region's important food crops, to assess whether the Green Revolution programmes are significantly raising productivity. The researchers also examined data on poverty and hunger to determine whether the incomes of small-scale food producers did in fact significantly improve, as well as the state of hunger across the region. Furthermore, four case studies were commissioned to research AGRA's impact in Mali, Kenya, Tanzania, and Zambia to get more nuanced analyses for single countries to show how AGRA is influencing policies, practices, and productivity.

Tufts researchers found little evidence of significant increases in productivity, income, or food security for people in the 13 AGRA main target countries, but rather demonstrated that AGRA's Green Revolution model is failing. **The main findings are:**

- Little evidence of significant increases in the incomes or food security of small-scale food producers. On the contrary, in countries in which AGRA operates, **there has been a 30 percent increase in the number of people suffering hunger,** a condition affecting 130 million people in the 13 AGRA focus countries;
- Little evidence that productivity has increased by any significant amount. For staple crops as a whole, yields only rose by 18 percent on average in AGRA countries in twelve years compared to 17 percent in the same period before AGRA. This **is an average annual growth rate of 1.5 percent which is similar to the time before AGRA.** Moreover the productivity growth declined in eight out of 13 AGRA countries, in three countries the figures have even shifted from positive to negative under AGRA. This is casting doubt about AGRA as a factor for productivty growth. Even maize, heavily promoted by Green Revolution programmes, showed just 29 percent yield growth, well short of AGRA's goal of 100 percent;
- Minimal reduction in rural poverty or hunger even where production of staple food increased, such as in Zambia, where maize production increased by more than 150

percent, mainly due to farmland increase. Small-scale food producers did not adequately benefit: poverty and hunger remained staggeringly high;
- Further erosion of food security and nutrition for poor small-scale food producers where Green Revolution incentives for priority crops **drove land use towards maize and away from more nutritious and climate-resilient traditional crops** like millet and sorghum. While seeds for traditional crops were formerly easy and cheap to get hold of via farmers exchange, the farmers now have to pay for seeds of "priority crops"; and
- Strong evidence of negative environmental impacts, including acidification of soils under monoculture cultivation with fossil fuel based synthetic fertilizers.[10] **Production increases have come from farmers bringing new land under cultivation.** Both aspects negatively affect climate change mitigation and adaptation.

Moreover, a more in-depth analysis in the four case countries (Mali, Kenya, Tanzania, and Zambia), plus a paper study from Rwanda, provide more indications of how the AGRA approach not only fails to achieve the desired effects, but also worsens the situation of small-scale food producers.

Examples from Tanzania show how the market dependency of AGRA's approach challenged small-scale food producers to settle the **input cost debt** when maize prices were too low after harvest: in some cases they even had to sell their livestock. Projects in Zambia also led to the **indebtedness** of participating small-scale food producers. Some explained that after the first harvest, they were already unable to repay loans for fertilizer and seeds.

It also shows that AGRA does not give small-scale food producers **freedom of choice** regarding what to grow. In a project in Tanzania for example, farmers are only allowed to participate in AGRA projects under the condition that they do not practice mixed cropping. Each crop needs to be cultivated in a separate field, which increases production costs and reduces crop diversity. In Rwanda, small-scale food producers were fined if they did not plant maize and other approved programme crops. Farmers were forced to use synthetic fertilizers, which were heavily subsidized. In projects in Kenya, farmers cannot choose the kind of maize seed they get, nor which fertilizers or pesticides. According to our interviews with farmers from AGRA projects, project leaders assumed that agro-dealers would make the best decisions for the farmers. This endangers the rights of small-scale food producers to self-determination and food sovereignty.

Furthermore, it is clear that the approach of AGRA moves small-scale food producers away from the cultivation of traditional food towards the cultivation of a specific crop, which **has led to a decline in nutritious and climate resilient crops** and a drop in low-cost, low-risk, and well-functioning farmers' seed exchange systems. In Rwanda for example, sorghum, as well as sweet potatoes and other roots and tubers, were the most important food crops prior to AGRA entering the region. Statistics for all 13 AGRA focus countries show that millet production fell 24 percent in the AGRA period. Overall, roots and tubers, which include nutritious traditional crops such as sweet potatoes, experienced a seven percent decline in yields. Groundnuts, a crucial staple source of protein in many countries, saw an alarming 23 percent drop in yields.

Scientists and political decision-makers have become increasingly aware of the limitations of input-intensive agricultural systems, particularly when endeavouring to combat or adapt to climate change. The UN Intergovernmental Panel on Climate Change (IPCC) recently documented the impact of industrial agriculture on climate change and called for profound changes to both mitigate against and help farmers adapt to climate disruptions.[11] In its Global Assessment on Biodiversity and Ecosystem Services, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is even more explicit and identifies industrial agriculture as a major driver of nature destruction. Accordingly, agriculture intensifications are leading to accelerated pollution of soils and waters among others.[12]

As we reach AGRA's self-declared deadline, it is time for African governments and other donors to reflect and to change course. **The publishers of this paper recommend:**

- **Donor governments** provide no further political and financial support for AGRA and switch their funding from AGRA to programmes that help small-scale food producers, particularly women and youth, and develop climate-resilient ecologically sustainable farming practices such as agroecology. This is a practice that is increasingly recognized and supported by the Committee on World Food Security (CFS), the UN Food and Agriculture Organization (FAO), and other international governmental donor institutions across the globe;
- **The German government** cease current and future AGRA funding and shift its political and financial support to climate-resilient, small-scale food production utilizing agroecology, and
- **African governments** withdraw from AGRA and other Green Revolution programmes, including farm input subsidy programmes, and transition their agricultural development programmes to more support policies that meet the expressed needs of small-scale food producers, tackle hunger and malnutrition, and are resilient to the impacts of climate change.
- **Generally, all governments worldwide** should fulfil their obligations under the Right to Food and other international commitments, especially the Voluntary Guidelines on Land Tenure (VGGT), the UN Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP), and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, also known as the Farmers' Rights Treaty or Seed Treaty).

1 AGRA: An Overview

The criticism of input-intensive[13] and industrial agriculture has been growing for decades. Climate-damaging effects, a tendency to increase environmental pollution, monopolization of economic product markets, and risks to agricultural livelihoods are some examples of powerful points of criticism.[14] Nevertheless, many foundations, donor organizations, lobbying groups, and governments doggedly pursue technology-driven programmes. The debate on the "Green Revolution" can be used as a blueprint for this. Formally part of every agricultural science curriculum and a reference point for so-called "agricultural development projects", criticism increased but was mostly ignored. The Alliance for a Green Revolution in Africa (AGRA) has become synonymous with the revival of these programmes and narratives.

Using the best data and information available, this report attempts to fill AGRA's accountability gap while questioning its narrative and its fatal development model. Findings call into question the efficacy of AGRA's approach and challenge its own transparency and that of donor governments. Unfortunately, AGRA declined Tufts researchers' requests to provide data from its internal monitoring and evaluation processes. In the absence of details about AGRA's direct beneficiaries, researchers relied on national-level data from AGRA's 13 main target countries on production, yield, and area harvested for most of the region's important food crops to assess the extent to which a Green Revolution in productivity is occurring. They examined available evidence on poverty, hunger, and malnutrition to detect signs that the incomes and food security of small-scale food producer households are improving across the region. To supplement findings, four case studies were commissioned to document AGRA's impact in Mali, Kenya, Tanzania, and Zambia.

After 14 years of operation, AGRA is swiftly approaching its self-declared deadlines of 2020 and 2021.[15] What was promised and what was delivered?

Since the start, AGRA has received nearly USD-$1 billion in contributions and distributed grants totalling roughly USD-$524 million during this time, mostly in 13 main target countries.[16] What happened to the remaining approximately USD-$500 million is not transparent. AGRA, unlike most NGOs, provides little accountability for money spent. In Germany, for instance, every NGO that wants to receive the well-known Donation Seal of Approval from the German Central Institute for Social Issues (DZI) must provide detailed and transparent accounting of how its funds are used. According to the DZI requirements, organizations may spend a maximum of 30 percent on administration. The German Federal Ministry for Economic Cooperation and Development, for example, refers to this seal when checking whether an NGO may receive public subsidies.[17]

AGRA has not published an overall evaluation of the impact of its programmes on the number of small-scale food producer households reached to illustrate improvements in their yields, incomes, or food security. Periodic reports merely highlight intermediate objectives such as the number of new seed varieties released, tonnes of seed produced in-country by domestic seed companies, number of farmers trained in new agronomic practices, and the number of crop breeders trained.[18] Similarly, the Bill and Melinda Gates Foundation has not published a comprehensive evaluation of the return on its very large investment,[19] indicative of the lax accountability among private philanthropic foundations in the United States.

This lack of accountability represents a serious oversight for a programme that has consumed so much in the way of resources as well as shaped the region's agricultural development policies with its narrative of technology-driven agricultural development.[20]

Overcoming Hunger and Poverty Through Productivity Gains Alone?

AGRA uses a technical approach to overcome hunger and poverty. Productivity gains are intended to provide more food on the one hand and to increase the income of small-scale food producers on the other.

However, AGRA's approach falls far short. Theoretically, enough food is already being produced today to feed all the people worldwide. There are problems of distribution, access, and competition for usage (e.g. agrofuel and animal feed versus food first), which have to do mainly with unequal power relations and discrimination against small-scale food producers.

At the same time, the industrial agricultural model with its high use of energy-intensive resources is not sustainable: not only in terms of the dramatic effects on biodiversity and soil fertility, but also the high emissions of greenhouse gases and the use of synthetic fertilizers.[21]

1.1 Green Revolution Reloaded

AGRA was initiated in 2006 by the Bill and Melinda Gates Foundation and the Rockefeller Foundation with the goal of delivering the kind of high-yield, input-intensive agriculture to Africa that previously failed to transform much of Asia and Latin America with the first Green Revolution beginning in the 1960s. AGRA's founders argued that scientific advances had transformed seed and other technologies to give Africa its own Green Revolution, one tailored to the specific ecological and climatic conditions across the continent. While the technologies may have evolved, the basic approach was the same: promoting the adoption of new high-yield seed varieties fed with synthetic fertilizer and protected using pesticides.

AGRA and the Bill and Melinda Gates Foundation also had extensive ties, including financial ones, to agribusiness firms such as Bayer (including Monsanto after the merger), BASF, Corteva Agriscience (a merger between Dow and DuPont), OCP Group (formerly Office Chérifien des Phosphates), Yara, and Cargill.[22]

AGRA developed an ambitious set of goals, in 2015 vowing to double the productivity and incomes of 30 million small-scale food producers, nine million directly and 21 million indirectly, by 2020.[23] Another important goal has always been to halve food insecurity in 20 countries by 2020.[24] Its original goals focused on doubling incomes for 20 million small-scale food producers through productivity improvements.[25] A 2017 strategy document talks about "contributing to" doubling yields and incomes for 30 million farmers.[26] Other references in AGRA's documents and on its website simply commit to "increasing" yields and incomes while shifting the end date to 2021. In this report, we hold AGRA accountable to its more specific and ambitious 2015 goals to double yields and incomes for 30 million farming households by 2020 because they were stated as topline goals on its website for a very long time. Interestingly, in June 2020 AGRA deleted these goals from its website without giving any explanation.[27]

AGRA focused its work on 18 countries (later reduced to 13). Working with governments, AGRA sought to speed up the development of high-yield commercial seeds in African countries and facilitate the delivery of seeds, synthetic fertilizers, and pesticides to farmers through a growing network of "agro-dealers". AGRA also supports the development of policies and market structures that facilitate the adoption of such Green Revolution technologies.

AGRA has always been controversial among Africa's farmer organizations. Many warned of imposing Western technologies that were unsuitable for the continent's soils, farmers, and food systems. Some decried the lack of consultation with African farmers on the nature of the interventions.[28] Others pointed out the serious flaws in the first Green Revolution, such as: depletion and contamination of water supplies with chemical runoff; farmers becoming increasingly indebted due to high input costs while yields declined after initial increases; and the loss of crop and diet diversity as the Green Revolution's narrow range of promoted crops took over the countryside. Additional concerns included the loss of food sovereignty and the ability of communities and nations to freely choose how they wanted to feed themselves if large commercial firms—backed by new government policies designed to ensure market access—dominated local markets.

The First Green Revolution

It was always contentious to be adopting a certain set of technologies including, but not limited to, hybrid seed, as well as the synthetic fertilizers used in crop production in Asia, Latin America, and, to a lesser extent, Africa. Critics said the technology package was unsustainable, would lead to long-term declines in soil fertility, deplete and contaminate groundwater supplies, and impoverish many small-scale food producers who would be unable to sustain crop yields or profits when faced with the higher costs of input-intensive farming practices.[29] The first Green Revolution beginning in the 1960s was also denounced as part of the United States' geopolitical development strategy.

More recently, historians have examined the myths and realities of the first Green Revolution.[30] Their accounts, grounded in empirical data primarily from India, suggest that crop yields for wheat and rice did not increase significantly faster after Green Revolution innovations than they were already rising. Agriculture was not stagnant and the new technologies did not appreciably increase yield growth. Therefore, the claim of "millions of lives saved" has to be revised; some historians suggest that even in the short term the new technology package may have had only a negligible impact on hunger in India. There is also evidence that neither high-yield seed nor synthetic fertilizer were the primary factors in the increased yields Indian farmers observed. According to recent studies, the most important investment was irrigation because the Indian government and donors supported the widespread installation of tube wells. Nonetheless, the long-term environmental toll on Indian farmers and on surrounding areas due to fertilizer contamination, among other factors, has been severe. Even long-time advocates of the Green Revolution approach acknowledge the damage caused by the technologies and practices it promoted.[31]

In the current Green Revolution campaign in Africa, little attention is paid to irrigation, which would automatically increase production even without imposing the use of hybrid seeds and synthetic fertilizers.

Since AGRA's founding, scientists and political decision-makers have become increasingly aware of the limitations of input-intensive agricultural systems, particularly when struggling to mitigate and adapt to climate change, and protect biodiversity. The famous 2009 "Agriculture at a Crossroads" report[32] showed that industrial agriculture was ill-suited to the climate, soils, and needs of people and states in the Global South, arguing forcefully that business as usual is no longer an option.

The UN Intergovernmental Panel on Climate Change (IPCC) recently documented the contribution of carbon emissions from industrial agriculture to climate change, calling for profound changes to both reduce its effects and help farmers adapt to climate disruptions.[33] In 2019, the High Level Panel of Experts on Food Security and Nutrition (HLPE) of the Committee on World Food Security (CFS) published a detailed analysis of the contributions that agroecological agriculture could make to food security and long-term sustainability.[34] As former FAO Director General Jose Graziano da Silva stated:

"We need to promote a transformative change in the way that we produce and consume food. We need to put forward sustainable food systems that offer healthy and nutritious food, and also preserve the environment. Agroecology can offer several contributions to this process."[35]

1.2 A Brief History of AGRA

The timing of AGRA's founding in 2006 was fortuitous. No sooner had AGRA been launched than food prices spiked on international markets, prompting food riots in more than 20 countries in Africa. With some exporting countries restricting exports to protect domestic food security, several importing countries found that they could not buy rice on international markets at any price. Maize prices more than doubled and the prices for rice even tripled.

Food-importing countries were among the hardest hit, including African countries that had once been net food exporters prior to the mid-1970s, before becoming large net food importers.[37] Being forced by the World Bank and other international donors through the structural adjustment programmes (SAPs) of the 1980s to import food, which was inexpensive and in surplus from developed countries, they focused their economic activities on crops or sectors where they had a "comparative advantage" rather than financially supporting their own food-producing sector, namely their small-scale food producers. With food prices spiking, it became clear how dangerous that gamble was. Many governments of the Global South vowed to increase their food self-sufficiency by investing in small-scale food producers who still provided most of their country's food and were among those most affected by hunger and malnutrition. Donors and international agencies agreed by acknowledging that countries in the Global South should grow more of their own food and invest in the smallholder farming sector to do so.[38]

African governments were already moving in that direction before the price hikes hit. In 2003 they launched the Comprehensive Africa Agricultural Development Programme (CAADP), in which signatories agreed to raise government commitments to agricultural development to at least ten percent of their national budgets.[39] In 2006 another declaration set a target for raising synthetic fertilizer use to at least 50 kilograms per hectare in all countries that signed the declaration, a dramatic increase over prevailing levels and a decisive step towards the Green Revolution approach.[40]

AGRA lobbies for the development of policies and market structures that promote the adoption of Green Revolution technology packages. The remainder of AGRA's budget in recent years has gone to programme administration, including the Africa Enterprise Challenge Fund, which supports African agribusiness initiatives, and to salaries,

Cooperation Between the Bill and Melinda Gates Foundation and the German Development Ministry

In 2016, the German Federal Ministry for Economic Cooperation and Development (BMZ) signed a memorandum of understanding (MoU) with the Bill and Melinda Gates Foundation to expand its cooperation with the foundation. The MoU focuses on the economic development of the African continent. The agriculture chapter is primarily concerned with the integration of small-scale food producers into traditional value chains, and with increasing agricultural production. The human right to food and human rights principles in general are not mentioned in the cooperation agreement—although the BMZ repeatedly emphasizes the human rights approach as the basis of German Development Cooperation.[36]

The Bill and Melinda Gates Foundation is, among other things, actively committed to the dissemination of genetically modified (GM) technologies. The WEMA (Water Efficient Maize for Africa) programme, which is being implemented in five African countries by Monsanto (now Bayer) and others, aims to introduce genetically modified drought-resistant maize. The Mozambique government, for example, was urged to relax the formerly strict GM technology laws. So far, the German Development Cooperation has ruled out the promotion of GM technologies.

Biodiversity and mixed-cropping on the fields—not with AGRA. AGRA projects promote mainly monocultures.
Photo: flickr.com/floeschen (CC BY-NC-ND 2.0)

which in 2018 accounted for more than USD-$22 million.[41]

AGRA's programmes and priority countries have changed over its 14-year history. For the first nine years, between 2006 and 2015, it provided grants to governmental, non-governmental, or private sector partners under three main programmes, namely the Programme for Africa's Seed Systems (PASS) to promote the development and use of high-yield commercial seeds; the Soil Health Programme (SHP) to promote the increased use of synthetic fertilizer and other soil practices in the name of Integrated Soil Fertility Management (ISFM); and the Market Access Programme (MAP) to promote farmer access to input and output markets. In 2016 AGRA shifted to its integrated Partnership for Inclusive Agricultural Transformation in Africa (PIATA) initiative, with issues which intersect with each other.[42]

AGRA is currently working in 11 target countries, previously 13, which are those covered in this report: Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Tanzania, Uganda, and Zambia (Niger and Zambia were removed but Zambia is now rejoining AGRA). Support has varied greatly by country, with Ghana getting the most support through 2018 (USD-$77 million) followed by Tanzania (USD-$74 million), and Mozambique (USD-$63 million), with countries such as Rwanda (USD-$10 million) and Zambia (USD-$12 million) receiving more limited funding.[43]

1.3 AGRA is Influencing Policies

Reforming national and regional seed policies to promote commercial seed producers and displacing the practice of using farm-saved or -bred seeds by small-scale food producers, has always been high on AGRA's agenda. Its current strategy lists "Policy and Advocacy" as its first programme, which actively pushes policies that open the doors to Green Revolution inputs, including pesticides, and prevents alternative approaches such as agroecology from receiving support. **Its strategy identifies three main advocacy priorities:**

- **Trade policies**—working to "create a common set of grades and standards for farm commodities that can open up new markets for small-scale food producers". The goal is to increase international market channels to integrate small-scale food producers into global supply chains and facilitate cross-border trade of commodities, which can create new vulnerabilities for small-scale food producers. Protecting small-scale food producers from the import of cheap food—which has been a problem for farmers for decades—is not high on its agenda.
- **Seed policies**—to "give small-scale food producers a wider choice of high-quality, high-yield crop varieties". Such policies have generally been those promoted by the African Regional Intellectual Property Organization (ARIPO) that focused on expanding the rights of commercial crop breeders to patent and sell certified seed while restricting the farmer's right to save, exchange, and sell farm-saved seed.[44]
- **Fertilizer policies**—to "encourage the expansion of fertilizer production and distribution networks that serve small-scale food producers". These involve speeding up the licensing and organization of agro-dealer networks to give farmers more ready access to synthetic fertilizers, pesticides, and other inputs making them dependent on access to these expensive inputs that have to be bought every planting season. Here it is obvious that synthetic fertilizers and pesticides go hand in hand through the agro-dealer networks. AGRA also financed the establishment of an African fertilizer and agribusiness lobby under the name African Fertilizer and Agribusiness Partnership (AFAP) with USD-$25 million. AFAP represents the interests of the fertilizer industry vis-à-vis African governments and donor organizations. One of AFAP's goals is to increase the use of fertilizers in Ghana, Mozambique, and Tanzania by 100 percent. AFAP partners include Louis Dreyfus, one of the world's largest grain traders, and IRM, a major US fertilizer trader.[45] In addition, the links between AGRA and AFAP are close: AGRA's President Agnes Kalibata is also a member of AFAP's Board of Directors.[46] AGRA also works on certification of synthetic fertilizer to ensure quality control given the prevalence of contaminated or counterfeit products.

Documentation on AGRA's policy initiatives is scant although it claims some credit for assisting in the passing of policy reforms and regulations that advance the Green Revolution agenda. However, it is important to note that such reforms were also heavily advocated by initiatives such as the G7 New Alliance for Food Security and Nutrition, which included negotiating reform commitments with participating African governments.[47] It is difficult to determine AGRA's particular contributions to such efforts, **but they have included:**

- **Seed policies**—AGRA documents its seed policy work in a report summarizing the initiative. Its stated goal was "seed policy and regulatory reforms that enable investment and growth of private sector seed businesses". It also supported ARIPO-aligned seed policy reforms in several countries such as Burkina Faso, Ghana, Nigeria, and Tanzania, the goal being to bring African countries under the International Union for the Protection of New Varieties of Plants (UPOV 1991) that guarantees "breeders' rights" to new seed varieties.[48] AGRA has also signed a Letter of Intent (LOI) with the Economic Community of West African States (ECOWAS) in 2017 with the aim of establishing a formal partnership.[49] Here, too, seed legislation is expected to conform with UPOV 1991. However, the UPOV 1991 criteria are often unattainable for small-scale food producers. Seed which does not meet the so-called DUS criteria for Distinctness, Uniformity and Stability of seed cannot be protected under the UPOV 1991 system, nor can it be included in the variety registers required by ECOWAS. It cannot therefore be traded on formalized markets. To make matters worse, the complex VCU criteria (Value for Cultivation and Use) must also be fulfilled in order to be included in the variety register. This comes at the cost of farmers' rights to save, exchange, and sell their farm-saved seeds. Farm-saved seeds remain the major source of seeds in Africa. **AGRA concludes: "The key policy issue is for governments to remove barriers to private introduction of varieties from any source."**[50]
- **Micro-policy reforms**—AGRA's 2007–16 Progress Report provides short descriptions of "micro-policy achievements" in specific countries, mainly involving seed and synthetic fertilizer policy reforms in Ghana, trade policies in Ethiopia, changes in seed and synthetic fertilizer regulations in Tanzania, and storage and marketing regulations in Burkina Faso and Mali.[51]
- **Nigeria policy reforms**—Efforts to reform seed, synthetic fertilizer, and marketing policies in Nigeria, which AGRA documents in a series of technical reports. Synthetic fertilizer reforms focused on developing local production and distribution to reduce costs. Seed policy reforms followed the ARIPO approach derived from UPOV 1991 commitments to convert "informal" seed systems into "formal" systems, limiting farmers' rights to save, exchange, and sell their seeds.[52] Interestingly, most of the seed law changes in Nigeria were implemented under the aegis of Akinwumi Adesina as Minister of Agriculture and Rural Development. He was previously Vice President of Policy and Partnerships for AGRA and before that Associate Director (Food Security) at the Rockefeller Foundation in New York. Today he is President of the African Development Bank.
- **Input subsidy reforms**—Studies and consultations across several AGRA countries to reform input subsidy programmes with the goal of allowing stronger participation by private sector firms in the production and delivery of inputs as well as to better "target" subsidies to farmers with the commercial potential to make productive use of them. This does however risk excluding small-scale food producers from receiving such support.[53]

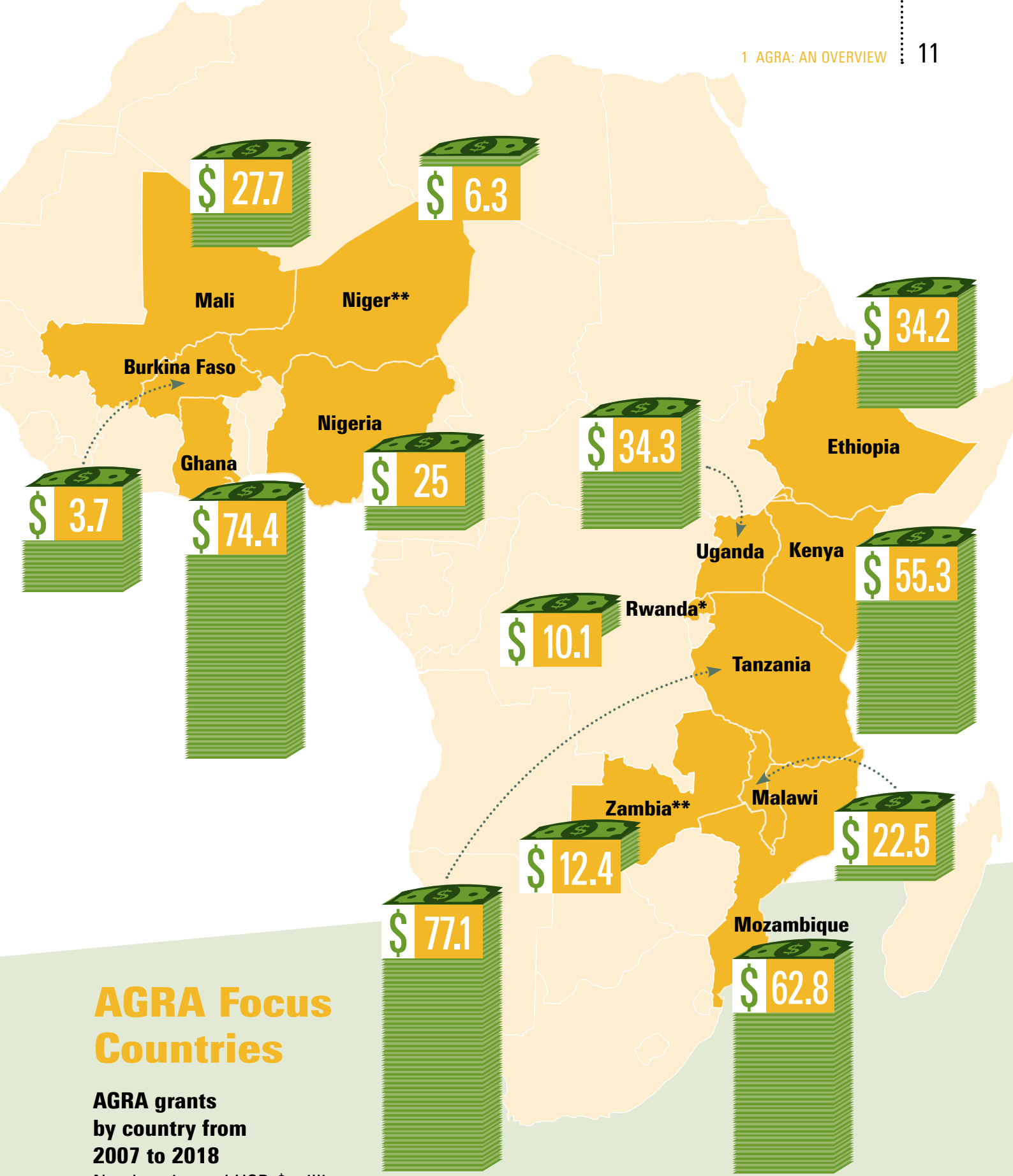
Looking at these efforts it is obvious that AGRA's main activities over the years have focused on bringing Green Revolution inputs to the farmers and eradicating farming practices such as saving seeds that are not in line with the Green Revolution vision. What are glaringly absent are actions to support small-scale food producers to enable them to get higher prices for their products, or to protect or establish their markets. So far most advocacy activities of AGRA are more geared toward improving commercial conditions for agro-businesses and agro-dealers than for small-scale food producers.

AGRA and the German Government

The first documented encounter between the German government, represented by the Federal Ministry for Economic Cooperation and Development (BMZ), and AGRA was in 2017 when AGRA President, Agnes Kalibata, first spoke at the G20 event, "One World—No Hunger. Future of the Rural World", hosted by the BMZ in Berlin.[54] Afterwards, in May 2017, the BMZ published the book "Partners for Change—Voices Against Hunger"[55] with a contribution by Agnes Kalibata.

In September 2017, at the seventh African Green Revolution Forum (AGRF) in Abidjan (Côte d'Ivoire), the BMZ and AGRA agreed on cooperation and funding of AGRA projects to the tune of EUR 10 million.[56] In 2018, the Credit Institute for Reconstruction (KfW) began implementing AGRA projects in Burkina Faso and Ghana.

During the same year the BMZ and the German Corporation for International Cooperation (GIZ) participated in the eighth AGRF in Kigali with a large delegation headed by Parliamentary State Secretary Maria Flachsbarth. The AGRF was also partly co-financed by the BMZ. In December 2018 the AGRA board meeting took place in Germany. In 2019 the BMZ again took part in the AGRF but this time with a significantly reduced presence compared to the previous year, and with no visible financing.[57]



AGRA Focus Countries

AGRA grants by country from 2007 to 2018

Numbers in total USD-$ millions

Notes: *2017 # of grants; 2007–2017 total; no 2018 data available; **2016 # of grants; 2007–2016 total; no 2018 data available
The grants for AGRA's 13 main target countries account for USD-$445.8 million. Additonally, AGRA supported more than these 13 countries and also non-national entities (e.g. the African Union) which accounts for USD-$524 million in total. Information on the spending of the remaining USD-$500 million is not available.

Source: Data through 2016: AGRA (2017), "Annual Progress Report 2007–2016" (Nairobi, Kenya). https://agra.org/AGRAOld/wp-content/uploads/2017/06/2016-AGRA-Progress-Report-Final.pdf
Data through 2017: AGRA (2018), "2017 Annual Report" (Nairobi, Kenya). https://agra.org/wp-content/uploads/2018/08/AGRA-2017-Annual-Report0708201802.pdf
Data through 2018: AGRA (2019), "2018 Annual Report" (Nairobi, Kenya). http://agra.org/ar-2018/wp-content/uploads/2019/07/AGRA-Annual-Report-2018.pdf

2 Case Studies: AGRA in Zambia, Tanzania, Kenya, and Mali

To provide a more comprehensive picture of AGRA's impact, we commissioned a set of case studies in Zambia, Tanzania, Kenya, and Mali. Kenya, Tanzania, and Zambia were chosen because AGRA-funded projects and initiatives have shown some impacts in those countries. Of the four, Mali is by far the most successful in terms of increasing food production and availability while reducing hunger and poverty. As our case study showed, the country owes its success not to AGRA and other Green Revolution programmes, but in part to farmer groups and the government's resistance to implementing the full Green Revolution programme. In all four countries, nationally available data was evaluated and interviews were conducted with scientists, government officials, representatives from civil society, and small-scale food producers.

2.1 Zambia: Who Gets the Value and Who the Chain?[58]

If AGRA has its way, farmers' seed fairs will soon be a thing of the past.

Photo: Juliet Nangamba Luo, CTDT Zambia

Between 2007–16, AGRA disbursed 24 grants in Zambia totalling USD-$12.4 million.[59] In the course of the year 2016 it was removed from AGRA's list of priority countries[60] but officially readmitted in 2019. The process of agreeing on areas of collaboration has begun. Until 2016 Zambia received three percent of the total AGRA grants. Funds predominantly supported agro-dealer development projects and research. They encompassed:

- developing the capacity of scientists in plant breeding and commercial seed systems in general, and funding research to develop hybrid seed varieties and conduct studies in soil health management;
- establishing and/or building the capacity of seed companies, agro-dealers, and other small and medium enterprises; and
- indirectly developing the capacity of small-scale food producers by linking them to input and output markets.

By far the largest grants have been to the USD-$3 million Agro-Dealer Project (ADAPT) implemented by CARE International, and the USD-$1.9 million Strengthening Agricultural Input and Output Markets in Africa (SAIOMA). Together with Support to Agro-Dealer Development (SADD, worth USD-$300,000), the main aim of these three projects was to expand the agro-dealer network in Zambia. They received more than 40 percent of the overall AGRA funding for Zambia. By 2015, according to AGRA, 1,797 agro-dealers had been trained.[61]

In its early days in Zambia, AGRA complained about the national Farm Input Subsidies Programme (FISP) because it "disincentivized" private sector participation in the value chain. But over the course of the AGRA engagement, FISP substantially aligned to the AGRA approach e.g. by opening it up to private fertilizer companies.[62]

In 2017 FISP consumed more than USD-$300 million of the public budget, some 50 percent of the national agricultural budget. Today the Government of Zambia still

owes agro-dealers USD-$106 million for redeemed input vouchers from the 2017–18 and 2018–19 seasons.[63] While this AGRA-supported Green Revolution model increases public debts, it also leads to the indebtedness of participating small-scale food producers—issues AGRA is silent about. Small-scale food producers participating in the SAIOMA project explained that after the first harvest, group members were already unable to repay loans for fertilizer and seeds. It is clear that FISP, a typical Green Revolution model, is a flawed and undiversified input subsidy programme that has kept small-scale food producers dependent on it, but with little or nothing left for research and development and extension services, and has had no impact on rural poverty levels. FISP has led to a dependency syndrome among small-scale food producers who cannot afford the market price of the inputs (especially synthetic fertilizers); and of soils dependent on synthetic fertilizers, where most soils in Zambia now cannot provide profitable yields of maize (especially) without the use of synthetic fertilizers. FISP mainly supports production of maize, and the failure to fully implement the E-voucher system—that offered farmers some autonomy over what inputs to buy—defeats the purpose of diversification. Although initially designed to help small-scale food producers to graduate from being subsistent to being emergent farmers, there is no evidence that any small-scale food producers have graduated in this way, and the government has not weaned off any farmers from the scheme in the 18 years of its implementation. FISP has also in a sense been hijacked by rural and urban elites to the extent that civil servants have found themselves on the scheme; and also on the input side where only a few suppliers benefit. Zambia's limited productivity gains and persistently high levels of rural poverty and malnutrition should serve as a stark warning to countries relying on Green Revolution strategies.

2.2 Tanzania: Dodgy Loan Schemes[64]

AGRA's favourite crop: maize.

Photo: Festo

Three quarters of Tanzania's roughly 55 million people live in rural areas and are highly dependent on rain-fed agriculture for their livelihoods. The country is one of the 11 Partnerships for Inclusive Agricultural Transformation in Africa (PIATA) countries, as well as hosting an AGRA flagship initiative, running from 2017–21. AGRA's work in Tanzania is centred primarily in the country's Southern Highlands and in the Kilombero Valley, which together constitute the breadbasket of the country.

One of the PIATA "Kilimo Tija"[65] projects in Tanzania is currently being implemented in the Katavi region in the district councils of Tanganyika, Mpimbwe, Mlele, Nsimbo, and Mpanda, targeting roughly 57,000 mainly small-scale food producers. Like many other AGRA-supported projects it promotes the use of external inputs in agricultural production. Since the majority of farmers do not have the cash to buy all inputs at once, arrangements are made to link them to agro-dealers that sell on credit. Farmer groups enter contracts with agro-dealers on behalf of their members, paying half the cost upfront with the balance on credit. Farmers are obliged to repay their loans after harvesting and selling their crops. Farmers are allowed to participate in the AGRA projects on the condition that they do not practice mixed cropping. This means each crop needs to be cultivated in a separate field, which increases production costs and reduces crop diversity.

The whole project is based on the assumption that farmers harvest and sell their produce at a price that enables them to repay the loans. However, prices for farm produce are volatile and often very low at harvest time. Focus group interviewees from Ibemwa village

in Mbozi District, who are the indirect beneficiaries of PIATA, revealed that maize prices were so low in 2019 that some farmers had to sell their livestock to settle the 50 percent input cost debt. If they are unable to service the loans they face the threat of further debt. Similar experience could happen to PIATA beneficiaries in Katavi, Rukwa and Kigoma regions. Neither the agro-dealers nor the corporations supplying the inputs bear risks, so they benefit either way.

Despite AGRA's presence in the country for almost 14 years, its strategies are not working. The number of undernourished people increased by four million from 13.6 million for the period 2004–06 to 17.6 million for the period 2016–18.[66]

2.3 Kenya: Fighting Hunger Through Synthetic Fertilizer Intensification?[67]

Small-scale food producers in Kenya discuss how AGRA projects are affecting them.

Photo: BIBA

In Kenya, AGRA has invested a total of about USD-$7.3 million in agro-dealer development engaged by the AGRA Programme for Africa Seed Systems (PASS), with Cultivating New Frontiers in Agriculture (CNFA), and Agricultural Market Development Trust (AGMARK) as the service providers. Approximately 25,000 agro-dealers have been trained and certified to operate as private input suppliers.

AGRA focused on commercial hybrid seeds, synthetic fertilizers, expanding market accessibility, and "enabling" agricultural policies. Kenya's fertilizer market is fully liberalized with the bulk being distributed by private companies. Between 2008–14, the Kenyan government fertilizer subsidy programme distributed 494,000 metric tonnes (MT) of synthetic fertilizer through a growing network of more than 5,000 agro-dealers situated in major towns and market centres across the country.

According to our interviews with farmers, many of them cannot afford to do soil testing to ascertain the right kind of crops and soil enhancements for their fields. As a consequence, the push for a Green Revolution has led to reduced soil fertility due to excessive use of inappropriate fertilizers. The immense application of synthetic fertilizer has long-term negative effects. Synthetic fertilizers kill beneficial microorganisms in the soil that convert dead organic material into nutrient-rich organic matter. Nitrogen- and phosphate-based synthetic fertilizers leach

into groundwater increasing its toxicity and causing water pollution. Under the Kilimo Biashara ("farming as a business") programme, supported by Equity Bank, the Kenyan Ministry of Agriculture, AGRA, the International Fund for Agricultural Development (IFAD), and the World Bank, farmers cannot choose the kind of maize seed they get, nor which fertilizers or pesticides. According to our interviews with farmers from AGRA projects, project leaders assumed that agro-dealers would make the best decision for the farmers. This endangers the rights of small-scale food producers to self-determination and food sovereignty. This means their right to freedom of choice is being violated. In addition, lock-in effects are to be expected, which may make it impossible for small-scale food producers to change their production methods and become independent of agro-dealers.

All these interventions show little visible or sustainable effect on the food situation in the country. On the contrary, during the AGRA period, the number of hungry people increased by 4.2 million and proportionately remained at about the same level.

2.4 Mali: More Food, Less Hunger, and Resisting AGRA[68]

Mali's small-scale food producers have successfully resisted AGRA: poverty and hunger have dramatically decreased.

photo: flickr.com/un-photo (CC BY-NC-ND 2.0)

Mali presents a stark contrast to most other AGRA countries, which may well be due to the government's more cautious approach to the widespread promotion of the Green Revolution technology package. Mainly small-scale food producers and other non-governmental organizations actively mobilized to stop AGRA from imposing its model in the country. Since democracy was restored in the 1990s, small-scale food producer groups among others have played a role in government policy, even drafting the 2004 Agricultural Orientation Law. Mali's Coalition for the Protection of African Genetic Heritage (COPAGEN) convened organizations from across Africa to engage with AGRA and dissuade their governments from participating by launching the 2007 campaign "Agroecological Alternatives to AGRA".[69] Mali's 2010 seed law recognized farmers' rights to seeds, and a revision currently under consideration, written with the active involvement of small-scale food producer organizations, will further enshrine those rights. This leaves small-scale food producers with greater sovereignty over the seeds and other inputs they choose to adopt.

Although AGRA operates in Mali, it does not enjoy the same level of influence as in many other countries. Maize has been the priority crop, as with a number of other AGRA countries, with input subsidies supporting crop expansion. The area planted with maize has more than doubled, and yields have increased significantly. But because Mali has low population densities and some "uncultivated" land available, this has not come at the expense of traditional crops, as is the case in other AGRA countries. Sorghum, millet, and pulses remain the country's most important food crops, with sorghum and millet planted on three times the land that is now under maize production.

Poverty and hunger have dramatically decreased. Extreme poverty (USD-$1.90 per person per day)[70] was reduced by more than half since 2006, to 24 percent. The number of the population suffering chronic hunger decreased from 1.4 to 1.2 million people and almost reduced by half in percentage terms between the three-year averages for 2004–2006 and 2016–2018. This progress may be attributed more to Mali's resistance to AGRA's Green Revolution policies and programmes rather than to their implementation.

3 AGRA in the Larger Green Revolution Context: AGRA versus FISP[71]

The following are considerations when evaluating whether AGRA and related Green Revolution programmes doubled productivity and incomes for small-scale food producer households while simultaneously cutting food insecurity by half.

Number of Households

AGRA's most recent progress report for the period 2007–16 fails to mention productivity, incomes, or food security. Instead it lists a set of intermediate objectives.[72] AGRA claimed it would double yields and incomes for 30 million small-scale food producer households by 2020, nine million directly (via farmers with whom it works) and 21 million indirectly (those who supposedly benefit from easier access to inputs, etc.).[73] According to the latest FAO statistics, there are about 35 million farms in the 13 AGRA focus countries. These figures include both small-scale food producers and large farms.[74] Based on these figures, AGRA would have to reach almost all small-scale food producers' households in the 13 AGRA focus countries in order to achieve its own objectives. Thus, national-level data seems an appropriate indicator to evaluate AGRA's progress.[75]

Determining Productivity

To the extent that we find any increased productivity, it would be a mistake to attribute this exclusively to AGRA. In the absence of any detailed impact evaluation of AGRA's work, it is virtually impossible to distinguish AGRA's particular contributions from those of the many other Green Revolution initiatives in Africa, such as Grow Africa or the G7 New Alliance for Food Security and Nutrition. As such, it is easy to overestimate the programme's actual contributions.

Not Without Subsidies

Farm Input Subsidy Programmes (FISPs) in varying forms heavily subsidize or support the distribution and use of hybrid commercial seeds and synthetic fertilizers among small-scale food producers. Ten of AGRA's 13 focus countries have seen significant adoption of FISPs. The resources used by national governments for such programmes, often heavily dependent on donor funds, generally dwarf those invested by AGRA. Where AGRA may dispense USD-$40–50 million per year in grants, African governments spend as much as USD-$1 billion per year subsidizing Green Revolution inputs, twenty times the amount spent by AGRA.[76]

Because the subsidies directly incentivize the adoption of the Green Revolution technology package among large numbers of small-scale food producers, they represent a larger and more direct intervention than any AGRA initiatives, which often complement FISP efforts.

Malawi, for example, devoted as much as 60 percent of its agricultural budget to its FISP, which reached a sizable

One focus of AGRA is the distribution of hybrid seeds to small-scale food producers via networks of agro-dealers.
Photo: flickr.com/Worldbank (CC BY-NC-ND 2.0)

section of the country's small-scale maize producers and increased technology adoption, even if it produced relatively small and unsustainable yield increases and failed to significantly reduce hunger. Next to Malawi's FISP, valued at USD-$55 million per year, AGRA's USD-$2–3 million per year represents a small contribution.[77] In Tanzania, AGRA provided an average of USD-$6.5 million per year in support, a fraction of the roughly USD-$50 million per year that the government supplies in input subsidies.[78]

Less Dependence on Government Handouts?

Whatever AGRA's formal position has been on input subsidies, there is no question that the organization's goals have been strongly supported by programmes that directly underwrite the costs of the inputs AGRA promotes. Even though most FISP initiatives directly support AGRA's overall objectives, AGRA has always somewhat distanced itself from such schemes.

AGRA has supported policy evaluations to promote more market-oriented interventions that are less dependent on government handouts.[79] Indeed, some FISPs have begun shifting to loan schemes and other private sector managed approaches, reforms that increase the risks for small-scale food producers as they go into debt to pay for inputs, as presented in the case studies from Tanzania and Zambia.

No Subsidy, No Synthetic Fertilizer

Most small-scale food producers cannot afford to purchase synthetic fertilizer, and many do so only when they receive a subsidy. This makes the Green Revolution technology package ineffective and unsustainable. Meanwhile, the high cost of subsidy programmes is proving economically untenable for many African governments, resulting in cuts to fertilizer subsidies. But research demonstrates that synthetic fertilizer used on monocultures of maize will, after a brief increase in yields, result in declining soil fertility over time in the absence of other forms of soil management. After an initial boost in yields, small-scale food producers and farmers in general need to use more synthetic fertilizer just to maintain the same productivity levels, and this increases the cost of buying inputs immensely.[80]

Without subsidies, the Green Revolution technology package simply does not pay. The African Centre for Biodiversity (ACB) estimated that in Malawi seeds and synthetic fertilizers cost three times the amount farmers could earn from a small maize yield increase, assuming the farmer can sell the excess.[81] Many cannot because, as subsistence small-scale food producers, their families need to eat. For many small-scale food producers, the Green Revolution package is just too expensive, which is why input subsidies have been critical in realizing the limited adoption.

Low Yields

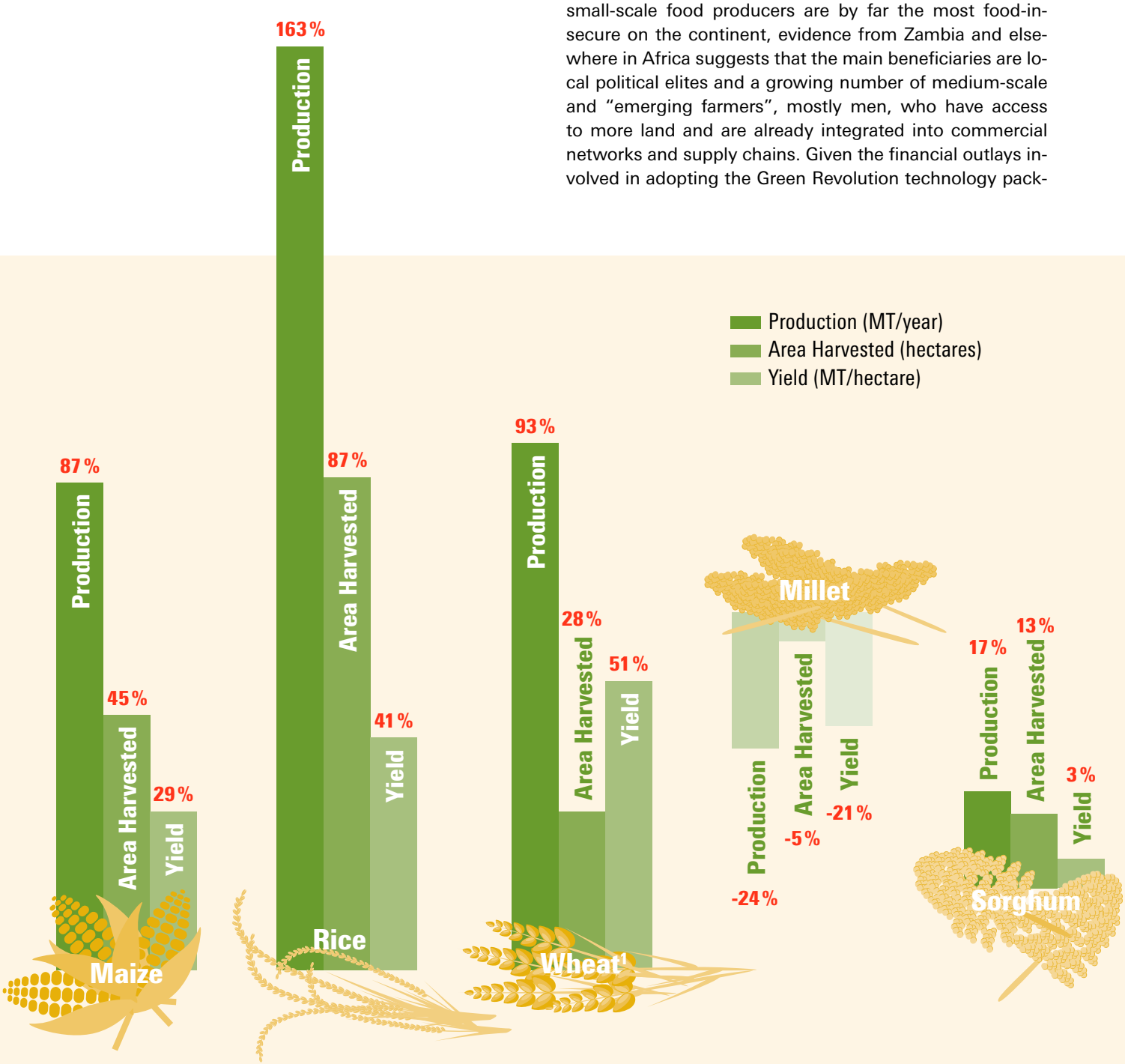
There is no reliable data on the acceptance of hybrid commercial seed varieties. But even where commercial seed and synthetic fertilizer use has increased, such as in Zambia, the results are poor. Since its FISP went into effect in 2002, Zambia saw a 70 percent increase in synthetic fertilizer use and an 80 percent increase in the use of commercial maize seeds. While production rose, yields increased very slowly in response to the use of synthetic fertilizers. Hunger and poverty indicators barely moved.[82] Zambia's experience shows the flaws in AGRA's basic premise that, once adopted, the Green Revolution technology package would increase productivity and reduce poverty. It has neither increased productivity nor reduced rural poverty and hunger.

4 The AGRA Impact Scorecard

4.1 Impact 1: Reaching Small-Scale Food Producers X Fail

While it is difficult to establish from AGRA how many farmers have been reached and who they are, its reports suggest very limited reach in terms of "direct beneficiaries". Annual country reports refer to farmers "committed", without defining what this means. In its reports, AGRA lists farmers as benefiting from training in Integrated Soil Fertility Management (ISFM) techniques—its term for the technology package. A process report for the period 2007–16 lists "5.3 million farmers with knowledge of ISFM", and "1.86 million farmers using ISFM". The technologies they are actually using, or the benefits accruing to them, are unknown.[83] In fact, one evaluation of AGRA's ISFM promotion in Ghana showed that training had little impact on adopting technology, and even when it did there was minimal impact on productivity.[84]

While children, indigenous people, and marginalized small-scale food producers are by far the most food-insecure on the continent, evidence from Zambia and elsewhere in Africa suggests that the main beneficiaries are local political elites and a growing number of medium-scale and "emerging farmers", mostly men, who have access to more land and are already integrated into commercial networks and supply chains. Given the financial outlays involved in adopting the Green Revolution technology pack-



age, this is hardly surprising. In fact, a recent AGRA report touted the success of this "hidden middle" in African agriculture.[85]

A comprehensive analysis across several countries also documented the nature of such emerging farmers, but it would be a mistake to assume that the success of this relatively small subgroup of farmers would lead to the sort of productivity and income improvements AGRA promised. Only a fraction of these farmers ever rise to the ranks of emerging farmers; many are new investors in farming from urban elites. As the authors point out, only a tiny fraction of small-scale food producers are likely to become emerging farmers, and therefore African governments and development agencies should prioritize the distribution of appropriate support to low-income small-scale food producers to promote long-term agricultural and social development.[86] The German Institute for Development Evaluation (DEval) strongly underpinned this view in a recent assessment of agriculture supply chains: poor farmers need risk-reducing strategies and many are not able to participate in such commercial supply chains.[87]

4.2 Impact 2: Productivity Improvements X Fail

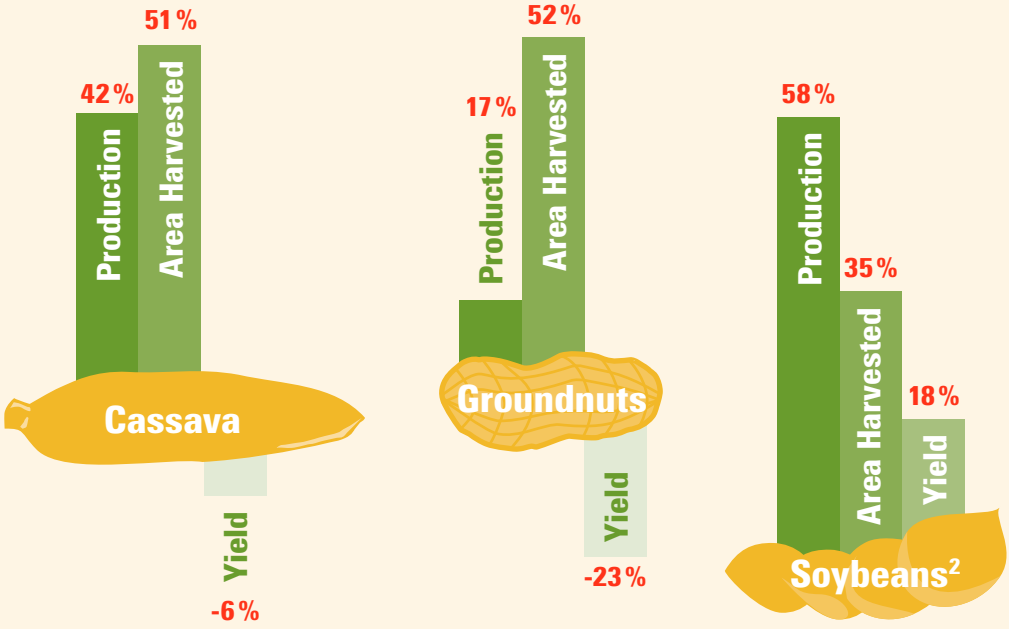
AGRA's results in terms of improving productivity are debatable and well below targets of doubling productivity, even for priority crops such as maize.

There is no sign of significant productivity growth in any major food crops to meet AGRA's goal of doubling yields. Over the 12-year period in which AGRA operated (2006–18) maize production in the 13 focus countries increased by 87 percent, a figure that would indeed be on track to result in a doubling (100 percent increase) of production by 2020. But this production gain was due more to a 45 percent increase in area harvested than it was to yield increases, which improved by only 29 percent.[88]

Three-year averages for 2004–06 were used as the pre-AGRA baseline from which to gauge progress, compared to the most recent data available: the three-year averages for 2016–18. These averages smooth out some of the annual fluctuations—due to weather or other variables—which are common in agriculture. The same data was

AGRA: Production Growth Mainly Due to Area Harvested

% growth, selected crops, 13 AGRA focus countries, 2004–2006 (pre-AGRA) to 2016–2018 (under AGRA)



Source: FAOSTAT for 13 AGRA focus countries: Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Tanzania, Uganda, and Zambia.
Notes: 1 excluding Burkina Faso and Ghana; 2 excluding Ghana, Mozambique, and Niger

used for each of the 13 AGRA focus countries included in the study.

Only in Ethiopia do we see the sort of productivity-driven growth in production promised by the Green Revolution. Yields increased by 73 percent in Ethiopia.[89] But among AGRA's top six maize producers, three—Nigeria, Tanzania, and Kenya—showed limited or negative yield growth.[90]

4.2.1 Area Expansion Driving Production Increases, Not Intensification

AGRA's goal was to increase production on existing land so as to avoid expanding the agricultural environmental footprint by cultivating new land. Sustainable agriculture is intended to minimize pressure on land and water resources while limiting further greenhouse gas emissions. The extent to which AGRA and other Green Revolution programmes encourage expanded planting is at odds with national and donor government commitments to combat climate change. Depending on available arable land in individual countries, expansion could pose a serious problem. Rwanda, for example, is densely populated and does not have vast tracts of uncultivated arable land.

Data clearly shows that maize support programmes are increasing total maize production far more through expansion than through productivity improvements. Some countries, such as Zambia, have nearly doubled the area planted with maize as a result of the Green Revolution incentives to plant the crop, yet their productivity growth over the 12-year period is just 27 percent.[91]

Ten of AGRA's 13 main target countries have input subsidy programmes that support priority crops with discounted seeds and synthetic fertilizers. In most countries the favoured crop is maize, which is also a major staple food. It has been well-documented that subsidies for a particular crop encourage farmers to plant more of that particular crop. Those with access to additional land have incentives to cultivate that land with subsidized seeds and synthetic fertilizers. In some countries, such as Zambia, some farmers also receive subsidized prices from the government, increasing the incentive to plant maize on new land.

4.2.2 Less Nutritious Food

One of the consequences of the Green Revolution's focus on maize and other commodity crops is the declining importance of nutritious and climate-resilient crops like millet and sorghum, traditional foods vital for healthy diets and staving off malnutrition. These crops are rarely supported by FISPs or AGRA; in fact, input subsidies and support for maize and other favoured crops provide incentives for farmers to decrease their cultivation of traditional food crops.

Statistics for all 13 AGRA focus countries show that millet production fell 24 percent in the AGRA period with a five percent drop in area planted and a 21 percent decrease in yields. Crop research rarely focuses on such crops. Sorghum is another traditional staple that has stagnated under the Green Revolution. Production grew just 17 percent as yields almost stagnated (increasing by three percent) while the area harvested increased only 13 percent.[92]

Prior to AGRA's involvement, nearly twice as much land was used to cultivate millet or sorghum than maize. Now, maize dominates due to the many incentives to produce the crop, despite the climate-resilience of traditional crops. In this sense, AGRA and other Green Revolution programmes undermine farmers' efforts to adapt to climate change.

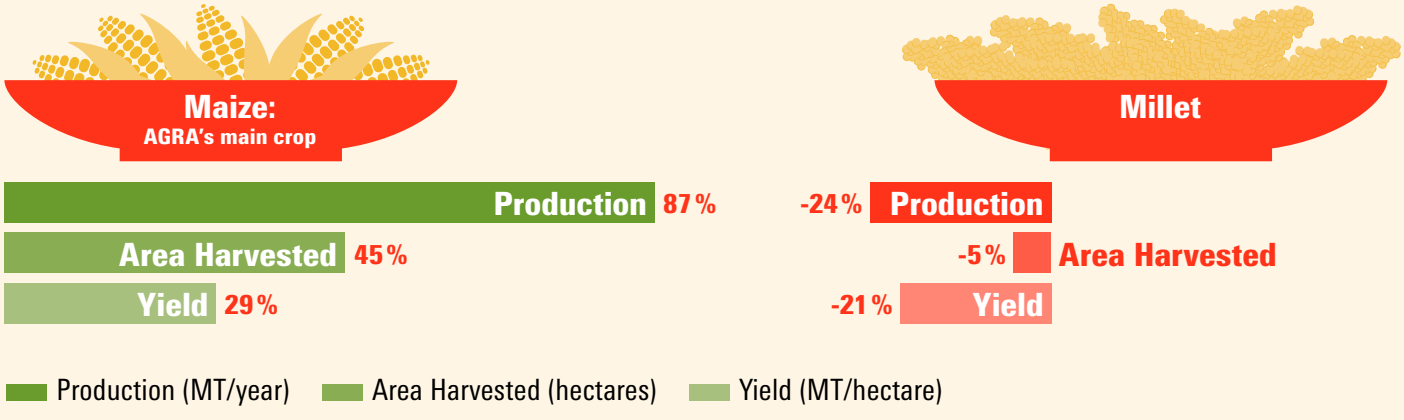
Several other important food security crops suffered as well. Cassava, a key staple in Nigeria, Mozambique, Uganda, Tanzania, and many other AGRA countries, saw a six percent decline in yields. Overall, roots and tubers, which include nutritious traditional crops such as sweet potatoes, experienced a seven percent decline in yields. Groundnuts, a crucial staple source of protein in many countries, saw an alarming 23 percent drop in yields.[93]

4.2.3 Decline in Staple Food Production

How can we better assess the overall impact of Green Revolution programmes on the productivity of staple crops as a whole, and not just on the favoured food crops?

Tufts researchers used national-level data to estimate the yield growth during the AGRA years for the four most important categories of staple crops in each country, namely: maize, millet, sorghum, and the broad category of "roots

Declining Importance of Traditional Nutritious Crops



and tubers", which includes cassava, sweet potato, and other key staples. In countries where other grains are key staples (teff in Ethiopia, rice in Nigeria), the more general designation "cereals, total" with "roots and tubers" was used. Researchers created one index by weighting the yield growth for each crop based on area harvested, a good measure of the prevalence of the crop. The resulting "Staple Yield Index" gives a more comprehensive picture of overall productivity growth for a range of key food crops.

No country is on track to reach the goal of doubling productivity. Only Ethiopia shows a staple crop yield growth above 50 percent for the AGRA period. Three countries—Burkina Faso, Kenya, and Nigeria—show declines in productivity for this basket of staple crops. The increase in productivity of staple foods in all 13 AGRA focus countries over the 12-year period (between 1992–1994 and 2004–2006) before the launch of AGRA is around 17 percent, which corresponds to an annual growth rate of circa 1.4 percent. AGRA's productivity growth for the same staples in the 12-year period between 2004–2006 and 2016–2018 is 18 percent. This corresponds to an annual growth of 1.5 percent. Thus, the increase in productivity under AGRA is almost the same as in the years before AGRA. In eight countries productivity growth declined compared to the pre-AGRA years. In three countries the figures have even shifted from positive to negative under AGRA. This is casting doubt about AGRA as a factor for productivity growth.[94]

Rwanda, touted by AGRA as one of its success stories, registers staple yield growth of just 24 percent when a fuller basket of food crops is accounted for, a growth of less than two percent per year during the AGRA period. This is because Rwanda's relative success in raising maize yields (+66 percent) is offset by stagnant yields for sorghum (0 percent), which before AGRA was a more important staple than maize. Yields also declined for rice. Perhaps most significant are yields for "roots and tubers", which increased by only six percent over the 12-year AGRA period. The Staple Crop Index shows[95] that Rwanda's apparent success with maize has come at the expense of more comprehensive crop productivity.

Rwanda: AGRA's Hungry Poster Child

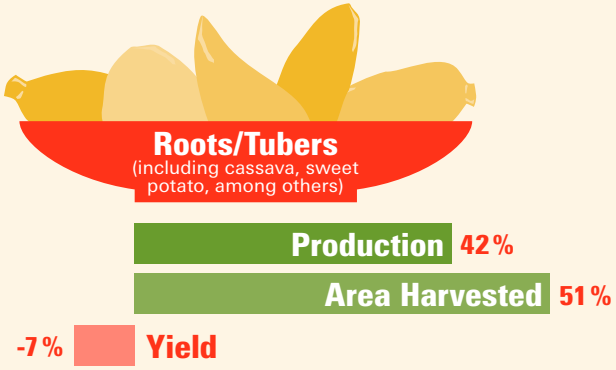
Rwanda is often cited as AGRA's poster child, the achievement that propelled Agriculture Minister Agnes Kalibata to leadership in AGRA. But results are mixed. AGRA can point to 66 percent growth in maize yields as evidence of success. But Rwanda's maize boom has come at the expense of more nutritious and diverse small-scale food production, and the Green Revolution technology package has been imposed with a heavy hand.

Data shows that while maize yields increased, backed by measures to enforce their use, most of the growth in maize production came from a 146 percent increase in land planted with maize. In this small, densely populated country, much of that land came at the expense of other staple crops, with the government reportedly banning cultivation in some areas. Sorghum, cassava, sweet potatoes, and other roots and tubers were more important food crops than maize before AGRA, providing nutritional diversity in addition to benefits to the land. Land given over to cassava fell 16 percent, while sorghum land declined by 17 percent.[96]

According to recent accounts, the Rwandan administration, with current AGRA head Agnes Kalibata heading the Ministry of Agriculture, imposed a strict Green Revolution regime in which farmers were fined if they did not plant maize and other approved programme crops.[97] This resulted in a detrimental effect on the traditional practices of intercropping with a wide diversity of food crops. Farmers were forced to use synthetic fertilizer, which was heavily subsidized. Forced cooperative schemes mandated crops and even seed use by farmers. Farmers resisted the Green Revolution campaign, with many losing their land or just refusing to plant. With President Paul Kagame facing an election in 2017, he relaxed some restrictions and in recent years more diverse cropping has returned, although maize and other priority crops remain heavily subsidized and supported.[98]

During the AGRA period, extreme poverty[99] remained high, falling only three percent to a shocking 60 percent between the years 2006 and 2018.[100] Although undernourishment decreased by nearly eight percent to 37 percent, the number of severely hungry people increased by 500,000 to 4.5 million. It is notable that poverty reduction in Rwanda was more effective in the 12 years before AGRA, when the number fell by 500,000 people.

% growth, selected crops, 13 AGRA focus countries, 2004–2006 (pre-AGRA) to 2016–2018 (under AGRA)



Source: FAOSTAT for 13 AGRA focus countries: Burkina Faso, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, Tanzania, Uganda, and Zambia. **Notes:** 1 excluding Burkina Faso and Ghana; 2 excluding Ghana, Mozambique, and Niger

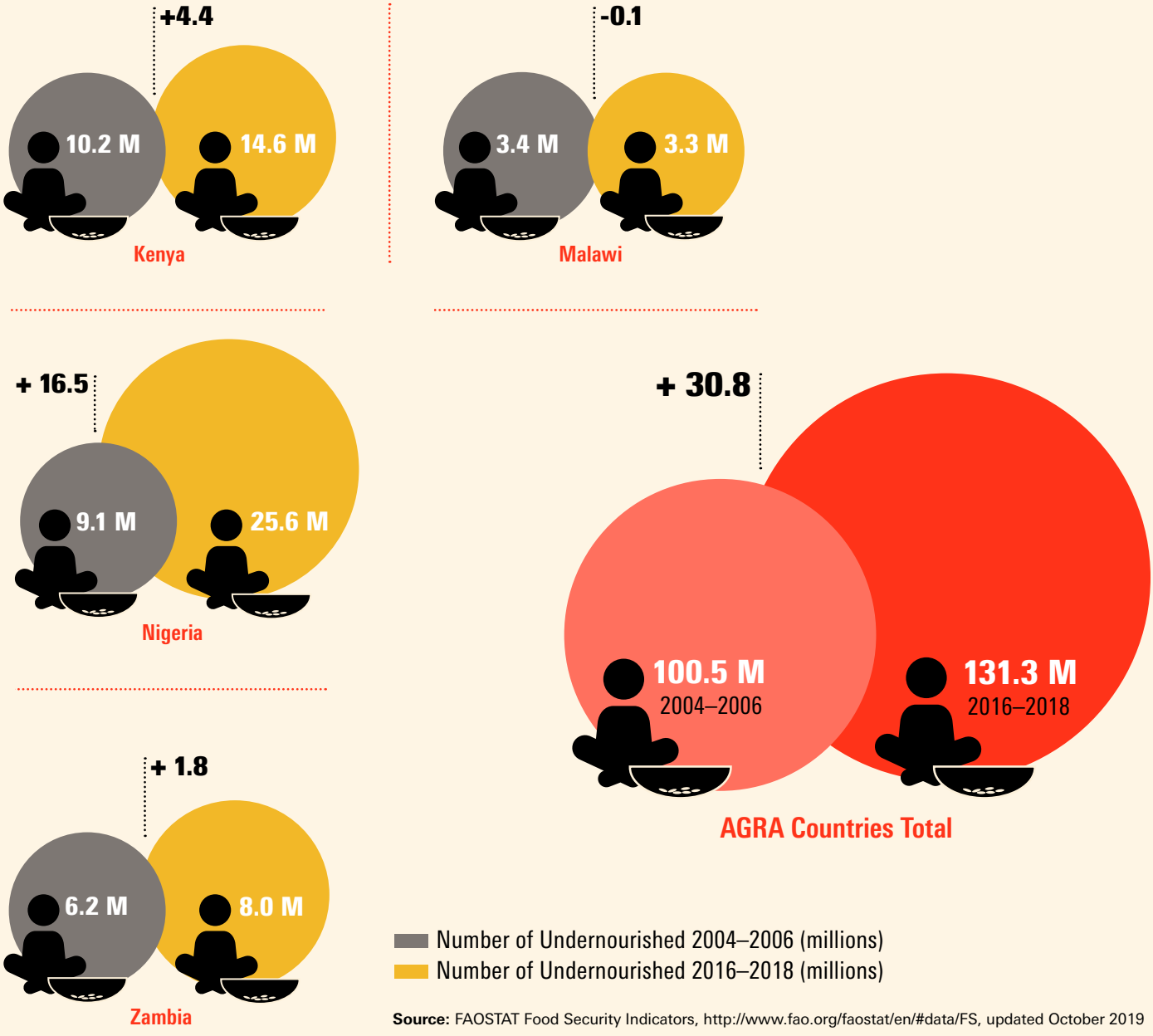
4.3 Impact 3: Raising Incomes of Small-Scale Food Producers and Reducing Hunger

X Fail

AGRA offers no measure of whether beneficiary incomes are increasing, never mind whether they are doubling. In fact, there is only anecdotal reporting about farmer welfare improvements with AGRA's interventions. FAO data shows that there has been a 30 percent increase in the number of undernourished people in the 13 AGRA focus countries during the AGRA years.

Rising Hunger in AGRA Years

Comparison of undernourishment in the 13 AGRA focus countries between the years 2004–2006 (pre-AGRA) and 2016–2018 (under AGRA)
figures in millions (M)



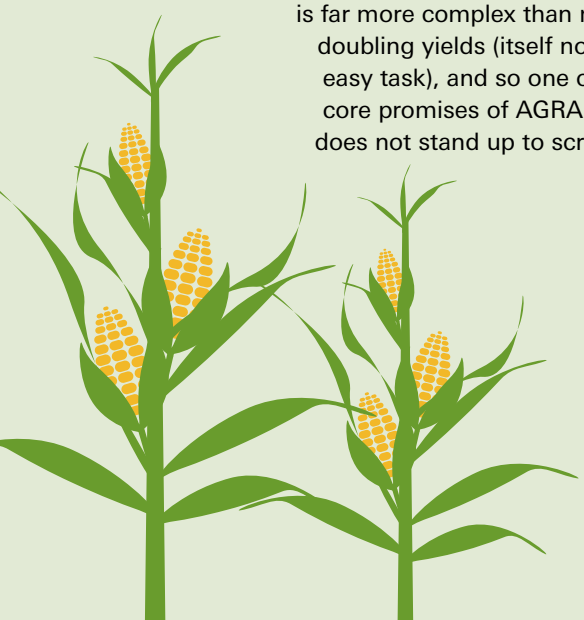
Source: FAOSTAT Food Security Indicators, http://www.fao.org/faostat/en/#data/FS, updated October 2019

Do Double Yields Mean Double Incomes?

The central point of AGRA's argument, and its objective of increasing synthetic fertilizer use and hybrid seeds, is that this will double yields. Using AGRA logic, doubled yields should result in doubling the incomes of small-scale food producers. According to AGRA's assumption, when farmers go to market and sell twice the amount of produce they will earn twice as much as before. Is this very simple and appealing assumption true?

Calculating a profit margin is based on receiving a realistic amount for the final product. Given this amount, the variable costs of production are deducted, which include expenses such as fertilizers, pesticides, hybrid seeds, the use of machinery, and so forth. There would be further deductions for fixed costs such as property rental or mortgages, utilities, associated taxes, etc. Only then can potential profit be estimated and a net-income increase for farmers occur.

Using the model of calculating profit margins per crop, it is possible that farmers might increase their incomes by following the AGRA model, but since the variable costs continuously increase, even if they doubled their production per hectare they will never double their income. This is especially true when small-scale food producers using AGRA's production model are compelled to buy far greater inputs than before. Additionally, the AGRA assumption does not recognize that prices for crops like maize are highly volatile. In most African countries, based on the principle of supply and demand, prices drop at harvest time. Small-scale food producers in particular are forced to sell their harvest immediately because they either need the money to survive or they lack storage capacity to sell their produce at a later date and get better prices. To conclude, doubling incomes is far more complex than merely doubling yields (itself not an easy task), and so one of the core promises of AGRA simply does not stand up to scrutiny.



Using national indicators related to poverty and food insecurity for the 13 AGRA focus countries, and primarily relying on World Bank and FAO data, it is evident that there has been limited and fluctuating progress in reducing food insecurity, weak progress in reducing poverty, and continued high rates of rural poverty.

FAO data on hunger (pre-AGRA to 2018) shows "Undernourishment", best interpreted as a measure of extreme food deprivation, and the change during the AGRA period in both the absolute number of chronically hungry and the "prevalence of undernourishment", i.e. the share of the population suffering chronic hunger.

The results are disturbing. The total number of severely undernourished people in AGRA countries increased from 100.5 million to 131.3 million, a 30 percent increase from before AGRA to 2018. Only Ethiopia reports a significant decline in the absolute number of chronically hungry people. Nigeria and Uganda account for a large share of the increase in undernourishment, with the number more than doubling over the 12-year period.[101]

Several AGRA countries posted improvements in the share of their populations suffering severe hunger, indicating progress in reducing the rate if not the number of hungry. But in four countries—Kenya, Niger, Nigeria, and Uganda—the share as well as the number increased. For Sub-Saharan Africa as a whole, the number of severely undernourished people increased by more than 50 million to 230 million people, while the share thereof decreased only slightly from 24.3 percent to 22.5 percent.[102]

Incremental improvements in the number of chronically hungry offers cold comfort when reviewing the new FAO measure of moderate and severe food insecurity. In Sub-Saharan Africa as a whole, nearly 600 million people are considered food insecure, a number that has increased by more than 100 million since 2014. That leaves an estimated circa 60 percent of the people living in Sub-Saharan Africa as being food insecure. Ghana reports just 5.5 percent of its people suffering severe hunger, but nearly half report food insecurity. Kenya's rates go up from 29 percent to 57 percent, while Tanzania's already alarming rate of severe hunger (40 percent) increases to 69 percent when counting all people reporting food insecurity. Malawi, often cited as one of the Green Revolution's success stories, has an estimated 82 percent of its people suffering moderate to severe food insecurity.[103]

Poverty Declining but Still High—AGRA Has No Real Impact

National measures of rural incomes, which would best allow us to assess AGRA's impact on farmer incomes, are not readily available, and nor is rural poverty consistently tracked, with data spotty from different countries. Rural poverty tends to be significantly higher than urban poverty, so by using national poverty measures, increases in rural incomes cannot be accurately determined. Rural poverty data suggests some improvement in some AGRA countries. Although rates remained over 50 percent in Malawi, Niger, and Zambia,[104] the latter reported an alarming 78 percent rural poverty rate that has not improved with its dramatic increase in maize production.[105]

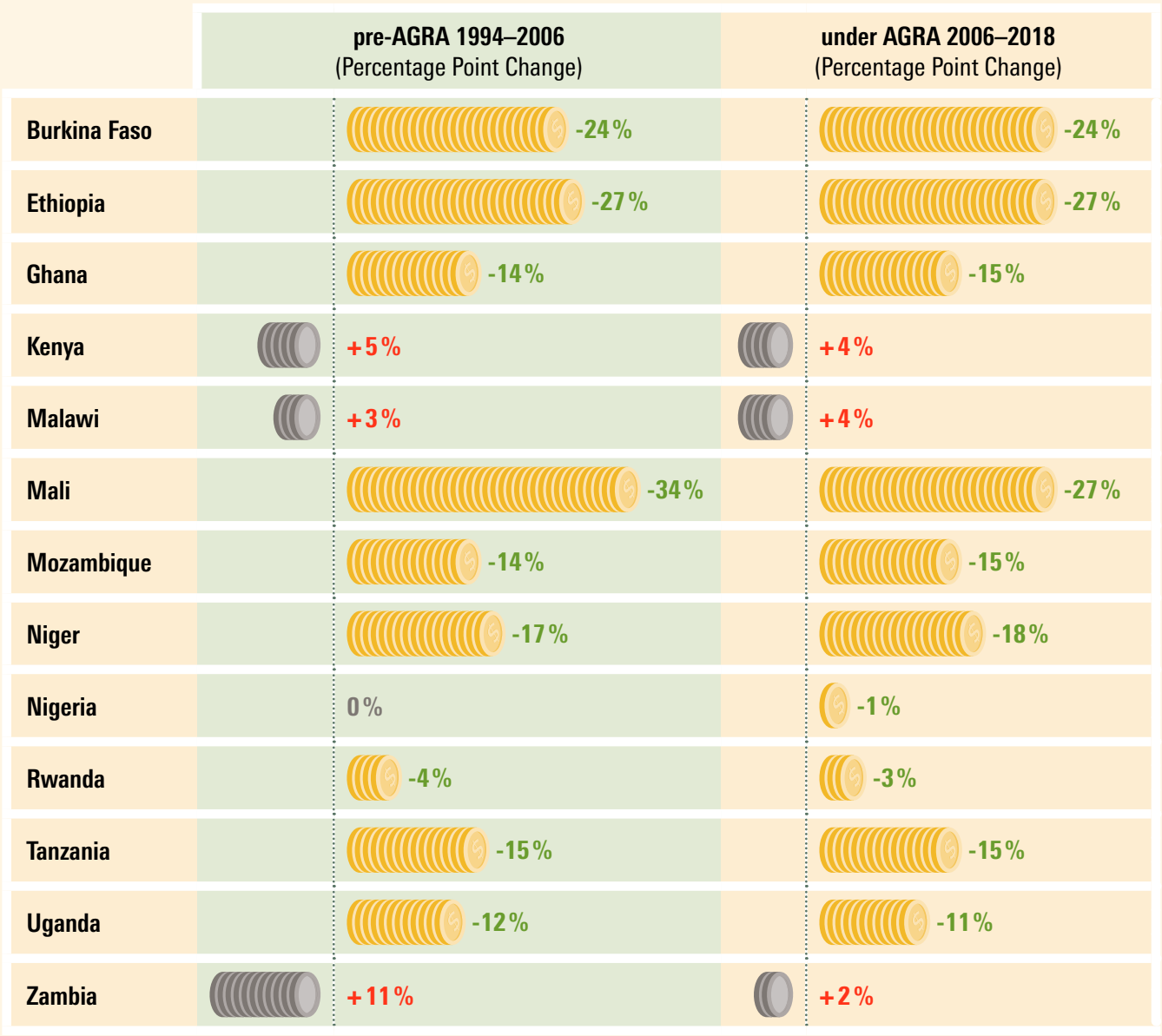
When comparing national poverty rates from 2006 and 2018 for AGRA focus countries based on the global

threshold for extreme poverty (USD-$1.90 per person per day),[106] data shows significant reductions in the rate of extreme poverty in a number of countries, such as in Burkina Faso, Ethiopia, and Mali. It is striking, however, that poverty rates in none of these three countries declined in the AGRA years further than they had in the previous 12-year period. It is however worrisome to look at the situation in the five AGRA countries where poverty increased, or barely decreased from already high levels. In Kenya, Malawi, and Zambia, national poverty rates increased, while in Nigeria and Rwanda they remained almost static at 55 percent and 60 percent respectively.[107]

Overall, there is no evidence that AGRA and other Green Revolution programmes are making an appreciably positive impact on farmer incomes and food security. Given the limited number of farmers reached by the programme, and the small and uneven productivity gains registered for priority food crops, it is not surprising that very few small-scale food producers are seeing improvements in quality of life from AGRA's interventions or related Green Revolution programmes.

Poverty in the 13 AGRA Focus Countries

Comparison pre-AGRA and under AGRA
poverty rate at USD-$ 1.90/day (%)



Note: Poverty line for extreme poverty, USD-$ 1.90 a day, in 2011 PPP.; **Source:** ReSAKSS, 2019, http://www.resakss.org/

4.4 AGRA's Results: Failure to Meet its Own Objectives

As AGRA's 2020/2021 deadlines loom, evidence suggests that AGRA and the Green Revolution campaign are failing Africa's small-scale food producers.

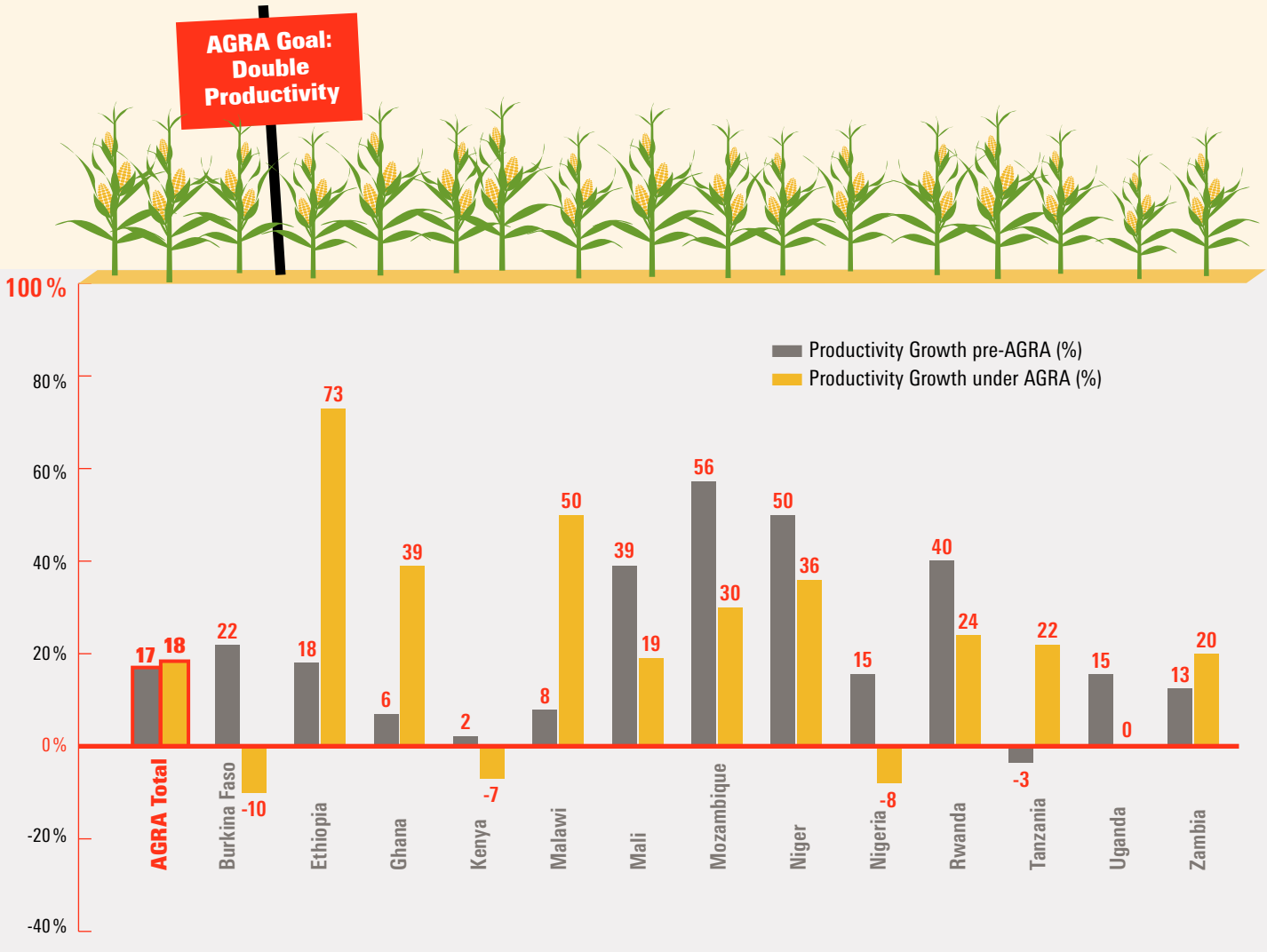
For AGRA countries as a whole, the picture is grim with small yield increases for staple crops and rising levels of hunger. Nine of AGRA's 13 target countries show rising hunger levels. In Rwanda, AGRA's supposed success story, the number of people going hungry increased by 13 percent while seeing mediocre productivity increases of 24 percent.

Only one country, Ethiopia, shows anything resembling the kind of yield growth and hunger reduction Green Revolution proponents promised, with a 73 percent increase in productivity and a 29 percent decrease in the number of those going hungry. Still, neither is on track to meet AGRA's goal of doubling productivity or halving the number of hungry, i.e. a 50 percent decrease. Ghana and Mali are the only other AGRA countries that show decent productivity growth with some decrease in hunger.

AGRA: Limited Productivity Growth

Comparision of changes in staple yields from 1992–1994 to 2004–2006 (pre-AGRA) and from 2004–2006 to 2016–2018 (under AGRA)

in % growth



Source: Calculation by publishers based on FAOSTAT for 12 year-period from 1992–1994 to 2004–2006; calculation for AGRA figures by Tufts researchers based on FAOSTAT 12 year-period from 2004–2006 to 2016–2018; **Staple Yield Index:** weighted yield increases for maize, millet, sorghum, roots/tubers. For AGRA total, Ethiopia, Nigeria, and Tanzania—cereals plus roots/tubers. Weighting based on share of total cropland.

Agroecology is the alternative to AGRA.
Photo: flickr.com/Thousand Currents

5 Agroecology: The Alternative

The recent report by the High Level Panel of Experts on Food Security and Nutrition (HLPE) on agroecology from the CFS offers additional evidence and is clear in its call for a break with the Green Revolution model, beginning its summary: "Food systems are at a crossroads. Profound transformation is needed." It goes on to stress the importance of agroecological agriculture, which supports "diversified and resilient production systems, including mixed livestock, fish, cropping, and agroforestry that preserve and enhance biodiversity, as well as the natural resource base."[108]

Since AGRA's founding, science and policy have advanced significantly, highlighting both the limitations of the input-intensive Green Revolution model of agricultural development, and the viability of alternative approaches. New literature was summarized and analyzed well in the report "From Uniformity to Diversity" by the International Panel of Experts on Sustainable Food Systems (IPES-Food), founded by former UN Special Rapporteur on the Right to Food, Olivier De Schutter.[109] The report clarifies a range of sustainable agricultural practices that move away from input-intensive monoculture cropping. They warn of "lock-ins" that are preventing the changes called for by a wide range of experts, from the IPCC to the FAO. They also identify seven key lock-ins, including "path dependency", the tendency of economic systems to follow prescribed development paths that are then difficult to change. AGRA seems to be feeding a concerning trend toward locking in path dependency on input-intensive agriculture, much to the detriment of small-scale food producers. A recent article in Food Policy[110] surveyed the evidence from seven countries with FISPs and found few indications of sustained, or sustainable, success. "The empirical record is increasingly clear that improved seed and fertilizer are not sufficient to achieve profitable, productive, and sustainable farming systems in most parts of Africa", wrote the authors in the conclusion.[111]

The vast majority of small-scale food producers on the African continent are not yet heavily reliant on such inputs, nor are they locked into production for supply chains that require the large-scale production of uniform commodities. Unlike farmers in countries in the Global North, their path has not yet been determined; opportunities remain to chart paths different from the industrial agriculture model promoted by AGRA. Agroecology is one of the systems offering farmers the kinds of innovation they need, i.e. farming with an awareness of nature and natural processes, to promote the soil-building practices that Green Revolution practices often undermine. Multiple food crops are grown in the same field. Compost, manure, mulching, leguminous crops, and biofertilizers—not fossil-fuel-based synthetic fertilizer—are used to fertilize fields. Biological pest control decreases pesticide use. Researchers work with farmers to improve the productivity of their seeds rather than replacing them with commercial hybrid seeds which farmers need to buy every year and douse with synthetic fertilizer to make them grow.[112]

In a study on the effectiveness of agroecology in regions of India, Senegal, and Brazil, the organization MISEREOR showed that agroecological farms were able to increase their productivity and improve their income. The median income for the agroecological farms in India was 79 percent higher, in Brazil between 177 to 284 percent—depending on semi-arid or humid conditions—and in Senegal 36 percent higher.[113] Jules Pretty from the University of Essex also compared how agricultural yields in the Global South develop when different resource-saving cultivation methods are used. Diversified farming systems yielded between 20 and 60 percent higher than the cultivation of just one crop. Traditional seed varieties which are adapted to local conditions performed particularly well.[114]

6 Conclusions and Recommendations

It is evident that AGRA is failing on its own terms. Its model of input-intensive agriculture is failing to reach large numbers of small-scale food producers, and when it does, it even fails to significantly increase productivity using its own promoted methods, or to raise incomes and, in turn, reduce poverty and food insecurity. AGRA will therefore not contribute to achieving the UN Sustainable Development Goals (SDGs) and particularly not goal two to end hunger. Astonishingly, there is little evidence of impact studies on AGRA's initiatives, which are so heavily supported by African governments through farm input subsidy programmes.

This lack of oversight calls into question the central premises of the Green Revolution model:

- **Will high-yield seeds and synthetic fertilizers be adopted by the majority of small-scale food producers in Africa?** No. AGRA has focused heavily on developing new commercial hybrid seeds and improving their delivery through networks of agro-dealers. This does not seem to have achieved high adoption rates, even with purchases subsidized by governments. Overall, only a small minority of small-scale food producers have been reached.
- **Will those inputs, and related investments in marketing and financing, double the yields on priority food crops?** No, even when adopted (thanks largely to input subsidies), there is little evidence to suggest that yields significantly increased. The annual rate of increase in productivity in the years before AGRA was similar to that during AGRA.
- **Will increased production double the net incomes of small-scale food producer families?** No, the yield increases have been small, and for many farmers the additional income from sales does not even cover the costs of inputs. Also, agricultural prices are so low that in order to double incomes, farmers would need to more than triple the area they farm. AGRA's focus is on putting farmers into large (international) supply chains that are notorious for paying poor producer prices (in many cases even below the cost of production). The incentives to abandon more diverse cropping systems actually undermine farmers' food security by decreasing diet diversity and reducing climate resilience. Severe hunger in the 13 AGRA focus countries has increased by 30 percent.
- **Can improvements be sustained over time?** No, temporary increases in yield from Green Revolution inputs tend to wane over time as soil fertility decreases under monocultures fed by synthetic fertilizers. Farmers grow dependent on input subsidies, which are declining under fiscal pressure. Meanwhile, they risk going into debt to pay for expensive inputs.

These failures show the Green Revolution model to be unsustainable and unaffordable for African small-scale food producers. Would AGRA countries not have been far better off today if AGRA's USD-$1billion budget was spent on agroecology?

Moreover, a more in-depth analysis in the four case countries (Mali, Kenya, Tanzania, and Zambia), plus a paper study from Rwanda, provide more indications of how the AGRA approach not only fails to achieve the desired effects, but also worsens the situation of small-scale food producers.

Examples from Tanzania show how the market dependency of AGRA's approach challenged small-scale food producers to settle the **input cost debt** when maize prices were too low after harvest: in some cases they even had to sell their livestock. Projects in Zambia also led to the **indebtedness** of participating small-scale food producers. Some explained that after the first harvest, they were already unable to repay loans for fertilizer and seeds.

It also shows that AGRA does not give small-scale food producers **freedom of choice** regarding what to grow. In a

Governments in the Global North and in the Global South must withdraw from AGRA and promote policies responding to the needs of small-scale food producers.

Photo: flickr.com/Thousand Currents

project in Tanzania for example, farmers are only allowed to participate in AGRA projects under the condition that they do not practice mixed cropping. Each crop needs to be cultivated in a separate field, which increases production costs and reduces crop diversity. In Rwanda, small-scale food producers were fined if they did not plant maize and other approved programme crops. Farmers were forced to use synthetic fertilizers, which were heavily subsidized. In projects in Kenya, farmers cannot choose the kind of maize seed they get, nor which fertilizers or pesticides. According to our interviews with farmers from AGRA projects, project leaders assumed that agro-dealers would make the best decisions for the farmers. This endangers the rights of small-scale food producers to self-determination and food sovereignty.

Furthermore, it is clear that the approach of AGRA moves small-scale food producers away from the cultivation of traditional food towards the cultivation of a specific crop, which **has led to a decline in nutritious and climate-resilient crops** and a drop in low-cost, low-risk, and well-functioning farmers' seed exchange systems. In Rwanda for example, sorghum, as well as sweet potatoes and other roots and tubers were the most important food crops prior to AGRA entering the region. Statistics for all 13 AGRA primary target countries show that millet production fell 24 percent in the AGRA period. Overall, roots and tubers, which include nutritious traditional crops such as sweet potatoes, experienced a seven percent decline in yields. Groundnuts, a crucial staple source of protein in many countries, saw an alarming 23 percent drop in yields.

Medium-sized farms with access to land, resources, and markets could undoubtedly see productivity improvements by adopting Green Revolution technologies. However, given the prevalence of hunger and poverty blighting the families of small-scale food producers, African governments and supporting development agencies should transition their agricultural development programmes to foster agroecology as a form of climate-resilient, sustainable agriculture. These initiatives should prioritize poverty reduction, mixed cropping and diet diversity, access to water for irrigation, and women's rights. Such priorities are consistent with the latest science on climate change, nutrition, soil fertility, and small-scale food producer-driven agricultural development, and are therefore the only way to ensure progress toward meeting the UN SDGs on ending hunger and poverty.

Based on the findings, it is recommended that:

Donor governments switch their funding from AGRA in favour of programmes that politically and financially support small-scale food producers, particularly women and youth, and develop climate-resilient ecologically sustainable farming practices such as agroecology, which is increasingly recognized and supported by the CFS and FAO and some international governmental donor institutions across the globe.

The German government should cease funding AGRA and any other programmes promoting Green Revolution practices. Instead, it should substantially increase its political and financial support for agroecological approaches and form a coalition of international donors in order to implement the FAO Scaling Up Agroecology Initiative.

African governments should withdraw from AGRA and other Green Revolution programmes, eliminate expensive and ineffective farm input subsidy programmes, and redirect spending toward the promotion of a more robust array of policies that respond to the expressed needs of small-scale food producers, tackle hunger and malnutrition, and are resilient to the impacts of climate change.

Generally, all governments worldwide should fulfil their obligations under the Right to Food and other international commitments, especially the Voluntary Guidelines on Land Tenure (VGGT), the UN Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP), and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA, also known as the Farmers' Rights Treaty or Seed Treaty).

AGRA: Assessing Progress Toward Goal of Doubling Productivity by 2020

Production, yield, and harvested area for selected crops, 13 AGRA focus countries

			Maize	Rice, paddy	Wheat	Millet	Sorghum
AGRA Total	% Growth	Production	87%	163%	93%	-24%	17%
		Yield	29%	41%	51%	-21%	3%
		Area	45%	87%	28%	-5%	13%
	Area (ha) 3yr avg. 2016–2018		23,713,981	7,610,751	2,093,972	14,131,237	17,223,546
	% of total cropland		16.7%	5.4%	1.5%	10.0%	12.1%
Burkina Faso	% Growth	Production	125%	209%	-	-12%	11%
		Yield	0%	-12%	-	-14%	-13%
		Area	128%	246%	-	2%	27%
	Area (ha) 3yr avg. 2016–2018		962,432	168,467	0	1,267,950	1,769,671
	% of total cropland		15.8%	2.8%	0.0%	20.8%	29.0%
Ethiopia	% Growth	Production	115%	1.119%	126%	150%	157%
		Yield	71%	62%	74%	83%	86%
		Area	24%	653%	30%	38%	39%
	Area (ha) 3yr avg. 2016–2018		2,181,662	48,112	1,720,835	478,592	1,850,154
	% of total cropland		12.4%	0.3%	9.8%	2.7%	10.5%
Ghana	% Growth	Production	70%	180%	-	3%	-14%
		Yield	26%	31%	-	14%	8%
		Area	35%	113%	-	-10%	-21%
	Area (ha) 3yr avg. 2016–2018		1,022,465	258,284	0	169,533	243,670
	% of total cropland		13.8%	3.5%	0.0%	2.3%	3.3%
Kenya	% Growth	Production	26%	66%	-34%	5%	33%
		Yield	-4%	0%	-16%	22%	-13%
		Area	31%	63%	-20%	-15%	49%
	Area (ha) 3yr avg. 2016–2018		2,190,596	28,394	123,999	97,391	203,863
	% of total cropland		34.6%	0.4%	2.0%	1.5%	3.2%
Malawi	% Growth	Production	57%	74%	-58%	42%	104%
		Yield	51%	38%	26%	6%	33%
		Area	6%	27%	-67%	34%	53%
	Area (ha) 3yr avg. 2016–2018		1,694,930	60,843	639	53,766	103,005
	% of total cropland		44.6%	1.6%	0.0%	1.4%	2.7%
Mali	% Growth	Production	414%	221%	391%	67%	106%
		Yield	63%	59%	52%	9%	1%
		Area	213%	101%	224%	53%	101%
	Area (ha) 3yr avg. 2016–2018		1,131,103	857,345	9,413	2,118,044	1,497,550
	% of total cropland		17.2%	13.1%	0.1%	32.3%	22.8%

% change from 2004–2006 avg. (pre-AGRA) to 2016–2018 avg. (under AGRA)

	Cereals, total	Cassava	Roots and Tubers, total	Groundnuts, with shell	Soybeans	Pulses, total	Staple Yield Index*
	55%	42%	42%	17%	58%	80%	
	27%	-6%	-7%	-23%	18%	51%	
	22%	51%	51%	52%	35%	19%	18%
	69,127,338	11,087,570	24,348,037	7,465,312	1,358,705	19,621,922	
	48.7%	7.8%	17.1%	5.3%	1.0%	13.8%	
	33%	-7%	0%	74%	410%	50%	
	-1%	-44%	-9%	6%	-7%	2%	
	34%	67%	7%	64%	441%	48%	-10%
	4,183,169	3,642	16,653	513,579	23,790	1,303,745	
	68.6%	0.1%	0.3%	8.4%	0.4%	21.4%	
	116%	-	67%	395%	4.999%	121%	
	81%	-	7%	70%	557%	83%	
	19%	-	56%	190%	840%	20%	73%
	10,364,300	0	1,351,409	79,897	38,443	1,593,952	
	59.1%	0.0%	7.7%	0.5%	0.2%	9.1%	
	67%	97%	84%	2%	-	137%	
	36%	56%	54%	30%	-	70%	
	23%	26%	20%	-22%	-	40%	39%
	1,691,775	979,076	1,722,596	356,227	93,016	536,125	
	22.9%	13.2%	23.3%	4.8%	1.3%	7.2%	
	16%	60%	-5%	-14%	2%	108%	
	-8%	34%	-28%	69%	9%	54%	
	26%	21%	29%	-49%	-6%	36%	-7%
	2,667,246	66,174	315,633	8,020	2,295	1,800,168	
	42.1%	1.0%	5.0%	0.1%	0.0%	28.4%	
	58%	103%	108%	102%	259%	127%	
	47%	38%	56%	23%	49%	78%	
	9%	47%	46%	64%	138%	27%	50%
	1,913,183	232,678	483,482	388,206	172,409	732,162	
	50.3%	6.1%	12.7%	10.2%	4.5%	19.3%	
	181%	84%	281%	40%	297%	233%	
	60%	-7%	0%	0%	-69%	211%	
	75%	95%	290%	41%	1.153%	7%	19%
	5,659,208	6,454	64,561	382,424	16,400	323,645	
	86.3%	0.1%	1.0%	5.8%	0.2%	4.9%	

			Maize	Rice, paddy	Wheat	Millet	Sorghum
Mozambique	% Growth	Production	42%	39%	173%	-20%	-41%
		Yield	27%	-32%	-1%	-9%	-13%
		Area	9%	107%	177%	-16%	-33%
	Area (ha) 3yr avg. 2016–2018		1,761,605	184,091	15,704	33,470	198,640
	% of total cropland		29.6%	3.1%	0.3%	0.6%	3.3%
Niger	% Growth	Production	341%	47%	-26%	50%	137%
		Yield	53%	14%	66%	26%	55%
		Area	234%	30%	-52%	20%	53%
	Area (ha) 3yr avg. 2016–2018		26,101	25,756	2,634	7,087,585	3,773,913
	% of total cropland		0.1%	0.1%	0.0%	39.8%	21.2%
Nigeria	% Growth	Production	72%	156%	-4%	-75%	-23%
		Yield	7%	40%	-17%	-49%	-10%
		Area	64%	83%	18%	-52%	-14%
	Area (ha) 3yr avg. 2016–2018		5,998,071	4,622,087	71,276	2,278,457	6,198,736
	% of total cropland		14.8%	11.4%	0.2%	5.6%	15.3%
Rwanda	% Growth	Production	305%	98%	-46%	28%	-18%
		Yield	66%	-19%	46%	-45%	0%
		Area	146%	147%	-60%	132%	-17%
	Area (ha) 3yr avg. 2016–2018		276,948	33,073	9,112	11,624	150,566
	% of total cropland		19.8%	2.4%	0.7%	0.8%	10.7%
Tanzania	% Growth	Production	59%	159%	9%	35%	13%
		Yield	15%	40%	-56%	28%	4%
		Area	38%	85%	146%	5%	9%
	Area (ha) 3yr avg. 2016–2018		4,084,119	1,201,393	101,008	334,579	782,779
	% of total cropland		26.1%	7.7%	0.6%	2.1%	5.0%
Uganda	% Growth	Production	142%	79%	47%	-67%	-28%
		Yield	64%	93%	-9%	-12%	-50%
		Area	48%	-7%	62%	-63%	44%
	Area (ha) 3yr avg. 2016–2018		1,158,047	95,586	15,156	155,405	426,232
	% of total cropland		12.7%	1.1%	0.2%	1.7%	4.7%
Zambia	% Growth	Production	153%	143%	49%	-19%	-31%
		Yield	27%	8%	7%	-3%	-11%
		Area	99%	120%	38%	-17%	-25%
	Area (ha) 3yr avg. 2016–2018		1,225,901	27,320	24,195	44,840	24,767
	% of total cropland		32.0%	0.7%	0.6%	1.2%	0.6%

Source: FAOSTAT crops data, http://www.fao.org/faostat/en/#data/QC, updated February 2020.

Notes: % changes are between 2004–06 3yr average and 2016–18 3yr average; Tufts researcher's calculation. 3-year averages used to account for yearly fluctuation in conditions.

Units: production in MT; yield in MT/ha; area in ha; "-" indicates no data

***Staple Crop Productivity Index is sum of yield increases weighted by relative areas for maize, millet, sorghum, and roots/tubers.

Exception: AGRA total, Ethiopia, Nigeria, and Tanzania is weighted sum of total cereals plus roots/tubers.

Cereals, total	Cassava	Roots and Tubers, total	Groundnuts, with shell	Soybeans	Pulses, total	Staple Yield Index*
24%	58%	54%	5%	-	4%	
19%	44%	43%	-12%	-	45%	
4%	9%	6%	16%	-	-28%	30%
2,117,972	1,097,921	1,180,922	402,608	0	739,848	
35.6%	18.5%	19.8%	6.8%	0.0%	12.4%	
71%	130%	179%	248%	-	274%	
32%	46%	64%	29%	-	141%	
30%	57%	69%	170%	-	58%	36%
10,930,573	12,001	22,427	870,804	0	5,564,534	
61.3%	0.1%	0.1%	4.9%	0.0%	31.2%	
10%	42%	36%	-16%	24%	7%	
5%	-20%	-23%	-34%	4%	30%	
5%	78%	79%	29%	19%	-17%	-8%
19,352,657	6,598,593	15,299,257	2,803,902	724,167	3,551,798	
47.8%	16.3%	37.8%	6.9%	1.8%	8.8%	
82%	30%	3%	76%	1%	89%	
27%	55%	6%	-24%	-19%	23%	
43%	-16%	-3%	129%	26%	54%	24%
481,322	103,763	425,154	39,011	50,956	558,698	
34.3%	7.4%	30.3%	2.8%	3.6%	39.9%	
71%	-4%	44%	153%	104%	114%	
23%	-2%	18%	11%	25%	41%	
39%	-2%	22%	123%	70%	52%	22%
6,559,010	930,054	1,903,498	937,448	5,626	2,110,837	
41.9%	5.9%	12.2%	6.0%	0.0%	13.5%	
51%	-50%	-47%	-1%	-82%	71%	
31%	-75%	-39%	-48%	-43%	134%	
15%	124%	-13%	91%	-68%	-27%	0%
1,850,426	877,664	1,321,753	430,792	46,569	742,063	
20.3%	9.6%	14.5%	4.7%	0.5%	8.2%	
137%	2%	13%	134%	437%	38%	
28%	0%	-4%	-9%	18%	4%	
84%	2%	18%	159%	381%	33%	20%
1,356,497	179,550	240,690	252,395	185,034	64,346	
35.4%	4.7%	6.3%	6.6%	4.8%	1.7%	

Endnotes

Photo: flickr.com/Jasmine Halki (CC BY 2.0)

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9 Input-intensive agriculture is based on a constant growth in the use of agricultural inputs. These include synthetic fertilizers, hybrid seeds, pesticides, and mechanical equipment to increase productivity and thus agricultural production. This is often at the expense of people and the environment. Jobs in the agricultural sector, especially in the Global South, are lost, and small-scale food producers become dependent. The high use of fertilizers destroys soil fertility.

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