



Waiting for a Green Revolution

Predictions of a Green Revolution in Africa are overstated. Investment in African agriculture has been neglected by governments and donors. The proportion of aid allocated to agriculture fell from 17% in 1980 to 3% in 2005.¹ Population growth and declining productivity among smallholder farmers has increased the need for imported food. Calls for Africa to achieve self-sufficiency in food production have prompted comparisons with Asia's Green Revolution in the 1970s and 1980s. These notes argue for more flexible and varied responses to food insecurity in Africa.

- Asia's Green Revolution not replicable in Africa.
- Small farmers hit hardest by volatile prices for staple crops.
- Technology and innovation improve smallholder productivity.
- High-value export crops raise rural incomes.
- Self-sufficiency not the same as food security.
- New role for government in targeted subsidies and infrastructure.

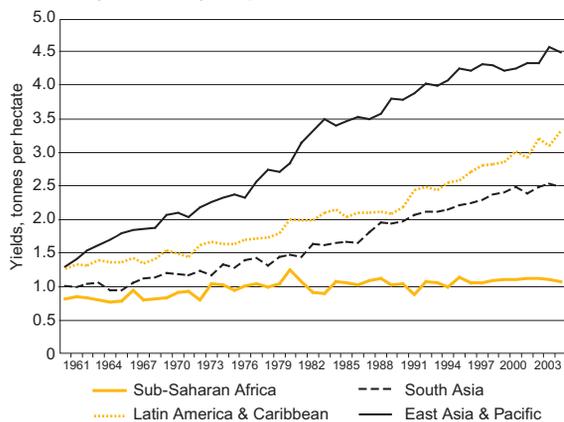
A history of neglect

Two-thirds of Africa's population depends on agriculture for their livelihood. But governments and donors have neglected the agricultural sector for decades, as education and healthcare received more attention and resources. Although the sector accounts for 30-40% of Africa's GDP, and almost 60% of export earnings, African governments spend on average only 3-4% of national budgets on agriculture. While development aid to Africa has increased by 250% since the early 1980s, the allocation to agriculture has halved.²

In the 1960s, Africa was a net exporter of food. Fifty years later, the continent imports a quarter of its food – at a cost of US\$28 billion in 2008.³ In the same year, 21 of the 36 countries requiring emergency external assistance were African. Over the first half of this decade, growth in agricultural output averaged 3.3% per annum in sub-Saharan Africa. But the gains are mitigated by population growth of 2.5% per annum. Africa is the only continent in which average cereal yields have shown no improvement since the 1960s. Yields for staple crops are a third of those achieved in Latin America, and a fifth of those achieved in developed countries.

Foreign donors have been wary of government intervention in agricultural markets since the post-independence era of subsidies, price regulation and parastatals. But the economic liberalisation imposed by structural adjustment programmes in the 1980s and 1990s fared no better in securing real improvements in agricultural productivity. In 2008, soaring food prices triggered riots in cities across Africa, from Dakar to Mogadishu.

Cereal yields, by region



Source: FAO, 2008.

People, and budgets

Africa's population has increased three-fold since 1960 to about one billion, and is expected to double by 2050.⁴ The majority of Africans live in rural areas. Improvements in the agricultural sector are essential if governments and donors are to achieve the first UN Millennium Development Goal of halving the number of people living in poverty by 2015.

In 2003, African governments pledged to spend 10% of national budgets on agriculture under the terms of the Comprehensive Africa Agriculture Development Programme (CAADP), an initiative of the New Partnership for Africa's Development (NEPAD). If this target is met, it would generate US\$20bn in new investment for agricultural development.



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By 2007, only one country – Mali – had achieved the target every year. But a global food crisis reiterated the importance of allocating greater resources to agriculture. In 2008, the World Food Security in Rome secured pledges to stimulate agriculture, which include US\$5 billion from the United States and US\$1.2 billion from the World Bank. At the G8 summit in L'Aquila in 2009, a further US\$20 billion was earmarked to promote food security and improve yields in developing nations.

“It is time for Africa to produce its own food and attain self-sufficiency in food production ... If ever there was a time for an African green revolution it is now”
– Kofi Annan, former UN secretary-general.

The Bill & Melinda Gates Foundation, the world's largest charitable foundation, has made agriculture the first priority of its Global Development Programme. In 2006, the foundation was instrumental in establishing the Alliance for a Green Revolution in Africa (AGRA), chaired by former UN Secretary-General Kofi Annan. By October 2009 it had pledged US\$1.4 billion to agricultural projects including AGRA's five-year African Soil Health programme, worth US\$165 million, and its US\$100 million African Seed Systems programme.

Small farms, big potential

Most strategies for agricultural development in Africa embrace the idea of a new Green Revolution, with self-sufficiency in food production as its main objective. The optimum scale of agricultural enterprises is a controversial issue. Large-scale commercial farms which can attract investment, technical knowledge and marketing expertise play an important role in some countries. But the acquisition of large tracts of land by foreign governments and investors in Madagascar, Sudan and Tanzania – as part of their own food security strategies – have prompted accusations of 'land grabbing'.

Proponents of such schemes argue that foreign-owned farms will create employment opportunities in neglected areas and that local populations will benefit from improvements in infrastructure. How best to use plots which are too small to produce a commercial income is also disputed. Subsistence farmers cannot significantly contribute to food security at a national scale. "Most people are not earning because the pieces of land they have access to are too small ... we have to get more people off the land, as we cannot continue a system with small pieces of land", remarked a high-ranked Rwandan government official in 2007.⁵

Smallholder farmers with average plot sizes of 1.6 hectares account for 80% of all farms in Africa.⁶ AGRA has recognised that improving smallholder productivity is the key to raising total agricultural output. Its aim is to focus on smallholder

farmers in 'high-potential breadbaskets' – defined as areas with large concentrations of farmers, relatively good soils and basic infrastructure.

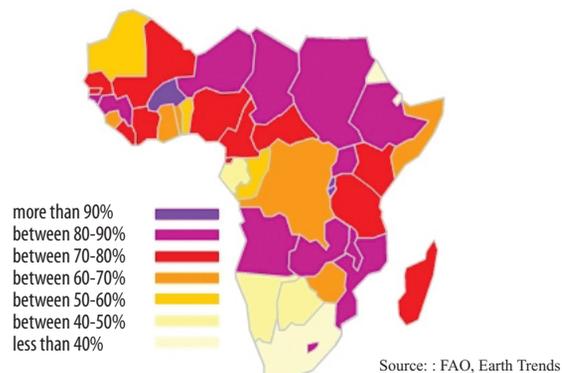
Green shoots

Smallholder farming has been the bedrock of much agricultural success in Africa, from cotton production in francophone West Africa to coffee and tea cultivation in Kenya.⁷ But self-sufficiency in food production will require better seeds, fertiliser and more reliable sources of water. Only 3.7% of arable land in sub-Saharan Africa is irrigated, compared with 29% in East and South-East Asia and 41% in South Asia.⁸ Fertiliser use per hectare in Africa is about 5% of the global average.⁹

Access to credit for agriculture is improving. In 2009, AGRA underwrote a US\$10 million loan guarantee with South Africa's Standard Bank to provide a three-year US\$100 million loan facility for small farmers in Uganda, Mozambique, Ghana and Tanzania. Plans for a scheme to underwrite additional loans of US\$1.45 billion for small farmers are underway, but more initiatives of this kind are required across the continent.

Self-sufficiency in food production is not synonymous with food security. In some regions, alternative means of raising rural incomes can be as effective in ensuring food security as increased food production. Surplus income from higher margin cash crops – such as vegetables and flowers for export markets – enables farmers to buy food at market. They are food secure, but not self-sufficient. Labour-intensive rural industries have similar potential, but have been impeded by a lack of investment, infrastructure and markets.

Agricultural labour force as percentage of total labour force in sub-Saharan Africa



Advocates of a Green Revolution in Africa place the greatest emphasis on staple crops. This strategy entails risks. Global markets for staples are volatile. In 2008, an increase of 50% in cereal prices benefitted few smallholder farmers in Africa. At least half of Africa's smallholders are net consumers of food. To compound their difficulties, many were hit by simultaneous rises in fuel and fertiliser costs.¹⁰

China and Tanzania Two Green Revolutions

In 1978, China launched agricultural reforms which led to its Green Revolution. By shifting production from large 'people's communes' to small-scale household farms, China advanced its strategy to attain 95% self-sufficiency in grain production. Reduced dependence on imports and a secure food supply were fundamental to political stability and rapid state-driven industrialisation.

In Africa, while China was constructing the US\$500 million TAZARA railway, President Julius Nyerere was simultaneously directing Tanzania in the opposite direction. By the mid-1970s, his *Ujamaa* project had resettled 90% of the rural population on collective farms. All agricultural industries were nationalised. The state became sole purchaser of crops, at fixed prices.

In China, agricultural reforms relaxed the government's monopoly of grain markets. A mandatory procurement system was retained, but the government paid market prices. Private trade in rice, wheat and maize was allowed to emerge. Higher prices in the new open market encouraged farmers to increase their output.

Nyerere's vision of an agricultural revolution attracted more than US\$10 billion in aid over twenty years. But by the end of the 1970s, Tanzania imported twice as much grain as before *Ujamaa*. Exports of cash crops fell by a third and GDP growth, which averaged 5% in the 1960s, slowed to a standstill. Nyerere's scheme for self-reliance and self-sufficiency made Tanzania heavily dependent on foreign aid.

The outcome of the Green Revolution in China could not have been more different. In 1978-84, the first reform period, agricultural output increased by an average of 5% per annum.¹² Average grain yields increased 30%, from 2,535kg to 3,615kg per hectare. In 1978-1997, the proportion of people living below the poverty line in rural China fell from 280 million to 50 million. Illiteracy rates dropped from 48% in 1970 to 10% in 1997. By 1996, 95% of villages had access to electricity.¹³

Rural unemployment in China remained high despite the agricultural boom. Migration to cities was restricted in order to contain the cost of subsidising urban residents. In response, the government in Beijing encouraged the expansion of industry into rural areas through Rural Township and Village Enterprises, or TVEs. By the 1990s, TVEs dominated key industrial sectors including the production of construction materials, fertilisers, food processing and textiles which generate a third of rural incomes.

Conditions in local markets can be equally volatile and challenging. Demand is driven largely by domestic consumption. Farmers often receive low prices for staple crops, particularly in years of over-supply. In 2001, Ethiopia experienced a record grain harvest helped by good weather and improved seed varieties. But in the absence of adequate storage facilities or alternative markets for surplus grain, prices fell by 80% and an estimated 300,000 metric tonnes were left to rot in the fields. The following year, below average rainfall caused crop failure, severe shortages and soaring prices.¹¹

Varied responses

China's Green Revolution achieved its goals in food production at enormous expense. The State employs about 60,000 senior scientists. By 2000, per capita fertiliser use was 2.5 times the global average. Three quarters of the grain harvest was produced on land irrigated by a network of 85,000 reservoirs.¹⁴ There has been no let-up in expenditure in the twenty-first century, as China pursues a US\$62 billion project to divert water from the Yangtze River to northern regions.

African countries cannot deploy resources on the scale seen in China. Even if resources were available, the input-intensive strategy of China's Green Revolution has brought serious environmental consequences which should not be replicated. A 'one size fits all' strategy ignores the diverse agricultural conditions of a continent comprising 54 independent states, as does an emphasis on boosting production of a very small number of key food crops. Other features of China's Green Revolution can usefully be 'borrowed' by Africa. The development of Rural Township and Village Enterprises was instrumental in boosting rural incomes and employment. Most importantly, the revolution was led by small farmers.

Africa's diverse agricultural conditions call for more varied strategies to increase agricultural production. Traditional crops, for example, are often better suited to areas with low rainfall. Finger millet, indigenous to much of East and Southern Africa, contains high levels of calcium and amino acids, absent in most staple cereals. Government support in the form of subsidies for improved seeds and infrastructure development will be important in areas AGRA describes as 'more challenging environments'.

"The real problem in Africa is not that rural people lack food, but that they lack money to buy food ... Horticulture has done more to combat food shortages than decades of efforts to make Kenya self-sufficient"

Stephen Mbithi, chief executive, Fresh Produce Exporters' Association of Kenya



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Recommendations

Calls for a Green Revolution in Africa have been overstated. Policies to make Africa self-sufficient in food production underestimate the diversity within the agricultural sector. Smallholder farms vary in size and capacity. While some smallholders have no option but to grow staple crops, others are able to exploit global demand for high value crops. Higher rural incomes play an important role in improving food security alongside increased production of staple crops.

The need for flexible and varied responses to agricultural development in Africa is demonstrated by the following:

- **Production subsidies are cheaper than food aid.** Food aid in Malawi during the 2004/2005 hunger crisis cost US\$93 million; this compares with US\$51 million spent on the 2005/2006 subsidy programme. Input subsidies targeted at small farmers significantly increased food production. The 2007 harvest yielded a record surplus of more than one million metric tonnes of maize.¹⁵ Malawi became a net exporter of maize, contributing to GDP growth of 8.4% in 2008.¹⁶
- **Semi-arid areas are suited to production of indigenous crops.** In the semi-arid district of Gutu, southern Zimbabwe, more than 1,000 small farmers are growing finger millet, pearl millet and sorghum, after the persistent failure of their maize crop. Traditional crops produce higher yields than maize in regions of low rainfall. Within two years, 60% of families in Gutu built food reserves sufficient for three years' consumption.
- **High value export crops boost rural incomes.** Kenya's horticulture industry generated gross annual revenue of US\$2 billion in 2008. The export market, which accounts for just 10% of total volumes, generated US\$1 billion. About 150,000 smallholders produce 60% of exported fruits and vegetables, earning seven to ten times more income than from staple crops.
- **Alternative markets for staples reduce risk for small farmers.** In Uganda, Nile Breweries Ltd – a subsidiary of the world's second largest brewery SAB Miller – launched the low-cost Eagle Lager, produced from locally sourced sorghum rather than imported barley. In 2007, Nile Breweries employed 8,000 smallholder farmers on contract to grow sorghum. That year, overall income from contracts increased from UGX500 million (US\$267,000) to UGX3.6 billion (US\$1.9 million). Sales of Eagle Lager made from sorghum have increased from one million cases in 2003 to four million cases in 2009.¹⁷ Eagle Lager is also produced in Zambia, where 2,500 farmers are contracted to grow sorghum.
- **Locally adapted seed varieties increase yields.** In Zimbabwe, scientists at Agri-biotech, a seed development company at the University of Harare, have developed new sweet potato plants free from viruses which damage yields. Agri-biotech distributed three million plants to 60,000 smallholder farmers via a network of NGOs. The new variety of sweet potato increased yields from 4-5 tonnes to 30-40 tonnes per hectare.¹⁸ In West Africa, the New Rice for Africa (NERICA) project developed locally adapted seed varieties, which yield 2.5 tonnes per hectare without fertiliser, contributing to a 6% increase per annum in Africa's rice output.
- **Open and transparent commodity markets encourage more efficient trading.** The Ethiopia Commodity Exchange (ECX), launched in 2008, coordinates all trade in the country's leading commodities: coffee, sesame, haricot beans, maize and wheat. The ECX matches buyers and sellers via an open bidding system on a trading floor in Addis Ababa. Participants benefit from reliable market information, standardised contracts, quality controls and secure mechanisms for exchanging goods and money.
- **Compliance with quality and sanitary standards improves access to international markets.** Kenya has significantly improved farmers access to European horticulture markets by developing strict national standards for the production of fruits, vegetables and flowers. The Kenya Gap standard, approved by the international certifier for good agricultural practice Global Gap, has greatly improved the quality and consistency of horticulture.

Africa Research Institute is a non-partisan think tank based in London and founded in February 2007. Our mission is to draw attention to ideas which have worked in Africa, and to identify areas where new ideas are needed.

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