Agriculture
The African Agricultural Revolution scenario

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Boosting farmers’ income helps stimulate general demand for goods and services in rural areas, which results in the establishment of new enterprises and contributes to the broader process of structural economic transformation and diversification. [51] This will hold even as most of the continent’s intense agriculture occurs at the periphery of urban centres, i.e. closer to the market, given the denser network of roads and access to markets here compared with the generally low road density in rural areas across much of Africa.

In this section we model an Agricultural Revolution scenario using four variables within the IFs forecasting platform. Each intervention initialises from individual country data, and the improvements are benchmarked to ambitious rates of progress in countries at similar levels of development. Generally, the magnitude of the interventions is more significant in most sub-Saharan African countries, which have lower current agricultural productivity and more potential than North Africa.

The four sets of variables are as follows and the underlying logic to their key outcomes and eventual impacts is summarised in Chart 7:

- **Direct improvement on yields:** Fundamental to this intervention is improved tenure security and transferability of ownership to unlock finance. Many African countries have recently started to overhaul communal land rights, creating something of a middle ground between individual freehold and the colonial customary model. Modern technology, such as aerial photography and digital platforms, can support the documentation of land and resource rights. The result is progress on land administration at a reasonable cost and is being pursued in countries as diverse as Ethiopia, Rwanda, Côte d’Ivoire, Ghana, Benin, Burkina Faso and Tanzania. [52] Rapid adoption of fertilisers, growing high-yield variants, improved water management and cultivating more appropriate indigenous crops are all potent yield multipliers. [53]

- **Amount of land equipped for irrigation that is being irrigated:** As the stock of land currently under irrigation in most African countries is meagre, this set of interventions comes off a shallow base. Just over 6% of cultivated land in Africa is under irrigation, compared with the global average of 21%. Therefore, the vast majority of cropland is dependent on good rainfall, which is increasingly irregular owing to the impact of climate change and desertification, to which Africa is particularly susceptible. Excluding South Africa, Africa also has the world’s lowest water storage capacity: 43 m³ per person compared with 6 150 m³ per person in North America. (South Africa’s storage capacity is 750 m³ per person.) As a result, much of the continent has little ability to control water flow and conserve it during periods of abundance for use during periods of scarcity.

- **Improved food supply chains:** Whereas the average loss and waste of agricultural produce in the rest of the world is roughly 14%, it is calculated at 24% in Africa and up to 30% in West Africa. Unlike in Europe and North America, where food reaches the consumer but is then discarded or wasted, almost a third of the food loss in Africa happens in the production stage. Better storage and infrastructure would help reduce losses, but more detailed data on the supply chain would also help. Modern technology can also play a big role here as, according to FAO, one-third of the world’s food — approximately 1.3 billion tons and worth US$1.2 trillion a year — is wasted. [54] Technology can help track inventory and reduce food waste along the distribution chain. One African example is InspiraFarms, which produces affordable, energy-efficient cold storage and processing equipment for on- or off-grid use. [55] The combination of reduced post-production losses together with increased yields can increase the availability of food for local consumption and export (or at least reduced import dependency).

- **Increased per capita caloric consumption:** Increasing individual energy intake from 2 600 calories per person per day in 2019 to 2 900 calories per person per day in 2043 is done to ensure that the increase in agricultural production is partly consumed domestically and does not benefit only exports (where it can earn valuable foreign exchange). The 2043 value...
is about 150 calories higher than the Current Path forecast.

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In the Agricultural scenario, Africa’s average crop yields improve by 50% by 2043 compared with the Current Path forecast (see Chart 8). The scenario represents an 83% improvement from 2019 levels by 2043 (with an average yield, across crop types, of 7.2 tons per hectare). These improvements are particularly potent for East Africa, where yields are set to increase by 74% relative to the Current Path forecast by 2043, while West and Southern Africa could achieve yield improvements of 43–50%. Even the comparatively modest interventions in North Africa could cause yields to increase by about 12%. Yields in Central Africa in 2043 are 60% higher than the Current Path forecast for that year. [56]

The interventions increase land under irrigation in Africa by approximately 7.6 million hectares by 2043 (Chart 10). This is a 55% improvement compared with the Current Path forecast for that year. The largest increase is in East Africa, where it almost doubles, coming off a low base.

Because of the large increase in available food, the scenario increases the total amount of agricultural waste. However, as a share of production, food loss and waste would decline dramatically. In the Current Path forecast, loss and waste would climb from about 23.6% in 2019 to about 27% of production by 2043. In the Agricultural Revolution scenario, rates decline to approximately 19% by 2033, and maintain a slight downward trend beyond 2043 (Chart 11).
Endnotes


5. T Lewis, *Transatlantic slave trade*, 2018


14. World Bank, *Aggregated LPI*

15. World Bank, *Aggregated LPI*

16. Embassy of the DR Congo, *Invest in DRC, Agriculture*


19. In 2003, the New Partnership for Africa's Development (now called the African Union Development Agency) published its Comprehensive Africa Agriculture Development Programme, with ambitious goals, namely to: allocate at least 10% of national budgets to agriculture; reach rural growth rates of 6% annually by 2015; integrate and invigorate regional and national agricultural markets; significantly increase agricultural exports; transform Africa into a 'strategic player' in global agricultural science and technology; practise sound environmental and land management techniques; and reduce rural poverty (see: M Fleshman, *Boosting African farm yields*, 2014).

20. The commitment to devote at least 10% of national budgets to agriculture and rural development was also included in the 2003 Maputo Declaration by African heads of state and reiterated in the 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation in Africa.

21. On aggregate, Africa spends only 5–7% of national budgets on agriculture, although a 2018 study found that 11 African countries did manage to allocate 10% or more of their budgets to agriculture in some years since 2005, with Ethiopia, Kenya, Mozambique and Sierra Leone achieving 6% agricultural

22. AllAfrica, Communiqué: Africa food security leadership dialogue, August 5, 2019

23. IPPMedia, Value add in Africa: First steps in a long journey, 2019; also see: African Cashew Alliance, About us

24. The world cocoa industry is worth more than US$100 billion annually; also see: Y Adegoke, Why Europe dominates the global chocolate market while Africa produces all the cocoa, 2018; D Philling, The African farmers taking on big chocolate, Financial Mail, 16 December 2019; H Fofack, Overcoming the colonial development model of resource extraction for sustainable development in Africa, 2019


29. See: F Mugira and A McGinnis, Sucked dry, Daily Maverick, 2021


31. World Bank, Agriculture in Africa: Telling facts from myths


33. World Bank, Agriculture in Africa: Telling facts from myths

34. In contrast to the tripling in growth cited earlier, this was an improvement across the entire country, so the growth is understandably much smaller; see: JY Lin, The Household Responsibility System in China’s Agricultural Reform: A Theoretical and Empirical Study, Economic Development and Cultural Change, 36:53, 1988, S199–S224

35. China-Africa Project, Chinese and African agriculture have a lot more in common that most people think: Interview with Xinqing Lu, Associate Programme Officer for Alliance for a Green Revolution in Africa, 3 December 2019

36. OEC, Brazil

37. GL Galford, B Soares-Filho and CEP Cerri, Prospects for Land-use Sustainability on the Agricultural Frontier of the Brazilian Amazon, Philosophical Transactions of the Royal Society B, 368:1619, 2013, 20120171.

38. L Abboud, The robot revolution down on the farm, 2018


40. R Kimani and P Bosire, FarmDrive, 2019

41. In most of rural Africa, precise location of a farm is objectively unknown so the location is determined via a series of SMS questions (e.g. time to walk to different primary schools). The more schools a farmer is familiar with in their area, the easier it is to hone in on their specific location.

42. J Bird, ‘Smart’ insurance helps poor farmers to cut risk, Financial Times, 5 December 2018; also see, for example, https://agrocenta.com/ and https://www.zenvus.com/.

43. World Food Programme & Oxfam America, The R4 Rural Resilience Initiative, 2011
44. S Gebre, AGRA plans to invest $500 million in African seed companies, Bloomberg, 7 September 2016

45. The Alliance for Food Sovereignty in Africa and its allied organisations argue that ‘AGRA has unequivocally failed in its mission to increase productivity and incomes and reduce food insecurity, and has in fact harmed broader efforts to support African farmers.’ See: Various co-signatories, Open letter: The Green Revolution in Africa has unequivocally failed, 15 September 2021


47. Ammonia manufacturing contributes 1% of worldwide carbon dioxide emissions. See LK Boerner, Industrial ammonia production emits more CO2 than any other chemical-making reaction. Chemists want to change that, Chemical & Engineering News, 15 June 2019


49. Indorama Petrochemicals, About IEPL, Port Harcourt


54. Food and Agriculture Organization, Food wastage: Key facts and figures

55. InspiraFarms, Our team

56. The improvements in yields are similar in magnitude to the improvements seen in South Asia between 1980 and 2020, and in a similar timeframe. Indeed, South America achieved a much more rapid increase between 2000 and 2010, moving from roughly 7.8 tons per hectare to about 11.8 tons.

57. Chart 14 presents the reduction in extreme poverty in African countries across the low- and middle-income categories. The reduction in extreme poverty in Seychelles, Africa’s only high-income country, is negligible.

58. The contribution of agriculture as a proportion of the Seychelles’ economy, the continent’s only high-income island state, was about 4% in 2019.

59. Some of these constraints can be overcome through technology, such as the use of precision irrigation and application of precise amounts of fertiliser exactly where they are required. Then there is also the potential of vertical farming, which could produce 180 m tons of food globally, according to some analysts.


61. Food and Agriculture Organization, Government expenditure on agriculture, 2019


63. Intergovernmental Panel on Climate Change, Working Group II: Impacts, adaptation and vulnerability, 2018


65. The International Institute of Tropical Agriculture does particularly impressive work in this regard. See: https://www.iita.org/
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