



New challenges, new opportunities

The changing context for our work

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The Syngenta Foundation's vision is a bright future for smallholder farming. This is a future in which farming is profitable, productive and resilient to climate change and other environmental threats. To help us realize this vision, we must take account of major trends and challenges facing the food and agriculture sector in the next five to ten years. Our focus is on those most relevant for smallholders in Africa and Asia. These trends and shifts are causes for both hope and concern. This paper looks at a selection of them. (For an additional discussion of the changing donor context, please see our paper on Funding & Resource Mobilization). We first describe the trends separately and then draw some overall conclusions for the Foundation's future work.

Climate change

- Climate change is the world's single largest continuing challenge. Agriculture both contributes to and is affected by climate change. Smallholders are particularly vulnerable.
- The Syngenta Foundation (SFSA) is therefore now integrating support for climate-smart resilient agriculture (CSRA) into all its work.
- For further information on the challenge and our response, please see the accompanying paper.



Demographic changes

By 2050, the world's population is expected to rise to almost ten billion, and agricultural demand by some 50% compared to 2013 (FAO, 2017). Income growth in low- and middle-income countries will increase consumption of meat, fruits and vegetables, relative to that of cereals. This will require corresponding shifts in output and will add pressure on natural resources.

Population dynamics will drastically change demographics in the coming decades. Projected growth in global population is expected to be concentrated in Africa and South Asia, and in cities. By 2050, two-thirds of the global population will live in urban areas. Low-income countries will also see large increases in the 15-24 age group (FAO, 2017). The number of young people in Africa is projected to increase by 42% between 2015 and 2030. Many countries are struggling to educate their youth and provide adequate employment; in parallel, many farming workforces are aging. The involvement of young people in agriculture is vital: they are energetic, productive and receptive to new ideas and advanced technologies.

The relative number of people in poverty has reduced dramatically over recent decades. However, the absolute numbers living in extreme poverty in Africa are not likely to come down soon. With urban migration higher among men, the burdens of extreme rural poverty increasingly fall upon women.



Consumer demand and preferences

Urbanization coupled with income growth changes food consumption. Higher urban income tends to increase demand for processed foods, convenience food, meat, fruits and vegetables. This broad transition can be observed from West Africa to South Asia. In West Africa, the share of food expenditure on meat, dairy and other high-value foods is projected to increase till at least 2040 (Zhou and Staatz, 2016). The evolution of food systems has both responded to and driven changing dietary preferences and over-consumption. As noted in our next section, the prevalence of overweight and obesity around the world have increased alarmingly (FAO, 2017).

In parallel, a growing number of consumers pay more attention to how and where their food is produced. Their demands include quality, safety, traceability, fair trade, local production and fewer negative effects on the environment. Some consumers are willing to pay more for sustainably produced food. At the same time, e-commerce enables many people to buy food online, sometimes directly from producers. In some societies, plant-based alternatives to meat and dairy products are increasingly popular. Demand here stems from concerns about the environment, animal welfare and human health. In many developing countries, however, the demand for animal protein is first expected to increase further.

Currently, vast quantities of food – as much as one-third of total production – are wasted or lost. In developing countries, losses mainly happen before or soon after harvest; in industrialized societies the waste typically occurs from sales outlet to consumers' tables. Major local efforts are underway to tackle food *waste*, but such initiatives do not typically help reduce *losses* in the field or early storage.



Nutrition

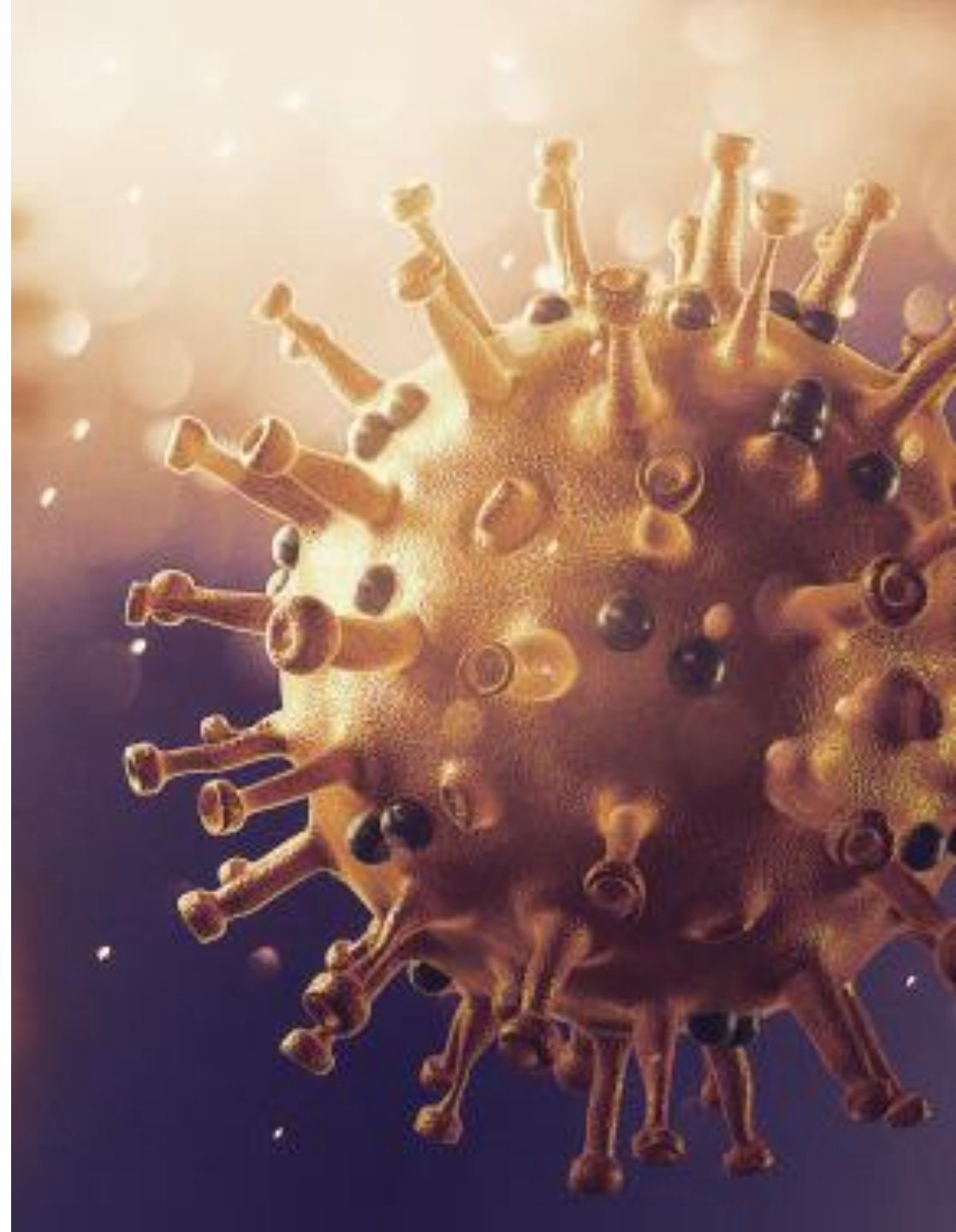
More and more countries are experiencing a double burden of malnutrition: undernutrition alongside obesity. Almost 690 million people in the world were undernourished in 2019; the majority live in Asia and Sub-Saharan Africa (FAO, IFAD, UNICEF, WFP and WHO, 2020). In 2020, the COVID-19 pandemic was predicted to increase the number of undernourished people by between 83 and 132 million. Without significant changes, almost seven percent of the world's population is expected to be undernourished in 2030 (FAO, 2018). Projections indicate that in 2025, 127 million children under five years will be stunted.

In the last two decades, the consumption of more nutritious fresh food increased worldwide. In most regions, however, the consumption of highly processed foods increased faster (FAO, 2017). Changes in dietary patterns are contributing to a rise in obesity and chronic diseases such as diabetes and heart disease, across the globe. According to the EAT Lancet report (2019), food is the single strongest lever to improve both human health and environmental sustainability. A transformation to healthier diets by 2050 will require substantial shifts. They include more than doubling the consumption of fruits, vegetables, legumes and nuts, and more than halving consumption of less healthy foods, such as those containing added sugars or red meat. However, the role of animal-sourced foods must be carefully considered in each local context (Syngenta Foundation, 2019).

COVID-19

The COVID-19 pandemic has led not only to a health crisis, but in some parts of the world also threatens food security. Virus mutations and slow vaccine roll-out mean that challenges will continue for some time to come. Smallholders are affected in many ways. They have faced difficulties in carrying out key agricultural activities, received low or inconsistent prices for their crops, or seen their income streams disappear entirely. Rural women often face disproportionately negative effects, as shown by recent studies by Actionaid (2020) and by other organizations including SFSA. In addition, women farmers face barriers and disadvantages that make them [less able to recover](#) from the crisis than men. Rural youth form another vulnerable group to suffer disproportionately from COVID-19; many young people earn only daily or weekly income; they have little or no access to social security.

The economic consequences of COVID-19 are huge. The IMF's World Economic Outlook anticipates \$28 trillion of lost output by the end of 2025. COVID-19 also delays the achievement of SDG goals, including reducing extreme poverty. However, the crisis also offers an opportunity to improve food systems. WBCSD's "PESTEL" framework indicates how (WBCSD, 2021). See also our section on agricultural finance below.



POLITICAL

- Reconfiguration of the food trade flows
- Fiscal stimuli for food system
- Enhanced data governance & use policy

Tailwinds

- Nutrition guideline innovations & specific action
- Improved regulatory frameworks
- Business & governments working more closely together to craft recovery programs & policies
- Support for predictable & science-based regulatory frameworks



ECONOMIC

- Market prices for food are higher due to supply chain shocks
- Small & medium-sized enterprises especially affected
- Smallholder farmers finding it harder to obtain quality inputs
- General loss of income for consumers

Tailwinds

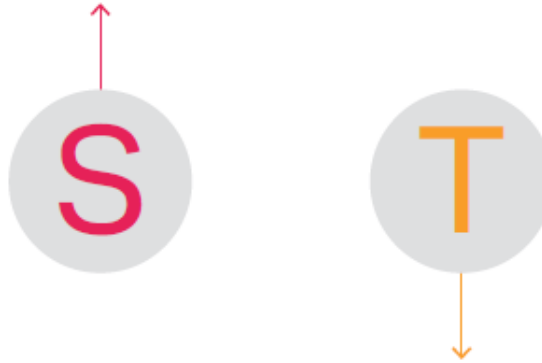
- Raised awareness around supply chain value distribution
- Innovations in financial instruments rewarding sustainability
- ↑ modularity & redundancy in meat & vegetable supply chain

SOCIAL

- Disruptions in farmer livelihoods
- ↑ food insecurity due to increase in food prices
- School closures = ↓ access to healthy foods for kids
- ↑ in food waste

Tailwinds

- ↑ interest in food system: waste, accessibility, affordability, traceability, safety
- Demand for sustainable business value creation
- ↑ home cooking, ↑ demand for long shelf life & plant-based items, ↑ demand for local foods



TECHNOLOGICAL

- ↑ investment in innovations in Food & AgTech
- ↑ presence of telehealth services
- Automation, mechanization to meet labor demands

Tailwinds

- Focused build of technological innovations for inclusion by geography (accelerated digital economy, expansion of connectivity between consumers & farmers)
- Demand for transparency, traceability in food system

ENVIRONMENTAL

- Suspension of environmental regulations
- Lack of enforcement capacity & ↓ surveillance = ↑ food fraud, deforestation, biodiversity loss
- Inability to integrate externality costs into prices
- ↑ in food loss
- ↑ in single use items & lack of proper disposal for biowaste (PPE)

Tailwinds

- ↑ interest in link between environmental health & human health
- Understanding that low-income populations most vulnerable to negative environmental effects



LEGAL

- Barriers to seasonal labor during pandemic
- Import/export regulation reduces ability to ameliorate supply chain shocks
- Revised benefit policies for medical leave

Tailwinds

- Renewed understanding of importance of food system workers, focus on protections for worker health & safety

New technologies

Technology in agriculture has made impressive strides in recent decades. Examples include genomics for improved crop varieties, and high-precision use of irrigation, fertilizers and crop protection. Further new technologies including sensors, devices and software are now starting to enable a different way of farming (De Clercq et al, 2018).

Future agriculture will use sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. These advances will make farming more profitable, efficient, safer and environmentally friendly. Several key technologies are relevant for smallholder agriculture. They include:



Digitalization is transforming the agricultural world. By analysing and correlating information about weather, types of seeds, soil quality, probability of diseases, historical data, marketplace trends and prices, farmers will make more informed decisions. Smallholders, especially younger ones, can benefit hugely from digitalization. This will bring not only efficiency gains with agricultural inputs but also market gains through e-commerce and digital platforms. Platforms such as 'Hello Tractor' in Nigeria could transform the mechanization of African farming. Connectivity and hardware challenges remain, but both are likely to improve rapidly in many developing countries.

Drones have the potential to improve several agricultural tasks. Their potential in smallholder farming remains unclear; widespread drone roll-out in low-income communities seems unlikely in the period covered by this paper. However, many Chinese farmers already have their crops sprayed by drones, which can apply minimum effective doses of treatments. This service provides significant benefits by replacing manual work and reducing wasteful input use.

Blockchain, the 'distributed ledger' technology, allows for highly secure digital transactions and recordkeeping. Blockchain can reduce inefficiencies and fraud. It could revolutionize traceability, thus also improving food safety, reduce waste by detecting supply bottlenecks and prevent price extortion and delayed payments. By lowering transaction fees, Blockchain could help smallholders keep a larger share of crop value.

In sub-Saharan Africa alone, more than 400 digital agriculture solutions were in use in 2020. They include applications in financial services, market linkages, supply-chain management, advisory and information services, and business intelligence (McKinsey, 2021). However, many isolated offerings fail to reach scale and improve many farmers' lives sustainably. Harmonisation and consolidation could stimulate growth and integration and enable smallholders to, for example, aggregate cost-effectively. However, many questions remain to be addressed.

Agricultural finance

Recent acceleration in innovation has powered changes in rural finance models. New technology enables providers to deliver better services and bundle them attractively for smallholders (ISF, 2019). For example, lending innovators now deliver credit directly to rural households through digital channels. This currently represents only a small portion of the lending market but has great potential to reach new customers. Currently, lenders meet only 30% of the \$240bn demand for smallholder agricultural finance (ISF, 2019). In smallholder insurance, too, there are still many challenges to widespread commercial viability (GSMA, 2020).

COVID-19, however, could provide a lasting boost to digital financial services. The pandemic has put e-commerce at the forefront of retail. The growth of e-commerce has contributed to an increase in digital financial services provided to small businesses and consumers. This 'embedded finance' is now expanding to digital firms operating in agricultural value chains. In Kenya, agricultural value-chain platform Twiga Foods partners with Jumia Kenya, an e-commerce platform, to sell baskets of assorted fruits and vegetables from smallholders directly to urban consumers.





Some consequences for our work in 2021-25

The trends and shifts described here have several consequences for our work. This is particularly true of climate change. Our integration of Climate-Smart Resilient Agriculture into all our initiatives is explained in a separate paper. A further paper examines the consequences of the changing partnership and donor environment.

We concentrate here on the changes outlined above. Some of these encourage us to continue our work as at present, others prompt a shift in emphasis. Our focus here is on the next few years.

Rising urban population and incomes present an excellent opportunity for smallholders to improve their livelihoods by serving city food demands. Through vehicles such as the Farmers' Hubs, and a new program already in preparation, SFSA will continue to help smallholders seize this opportunity in the best ways. Healthy vegetables will be among the key crops in this context, prompting our greater focus on them than, for example, cereals. The latter will, however, remain in strong demand for animal feed. SFSA will support smallholders' efforts to profit from rising meat consumption as well. Enabling smallholders to benefit to the maximum will include accelerated development and optimum use of digital tools that improve their access to credit and markets. In parallel we will work on those tools that enable their customers to meet higher traceability requirements.

The shifts in demographics and nutrition also have other consequences for our work. We will intensify our efforts to offer entrepreneurial rural youth more attractive professional choices in the countryside. We will draw here both on our experiences hitherto and on findings from our current studies in Nigeria and elsewhere. Particularly important will be the introduction of programs that specifically address women's opportunities. These will require a careful choice both of produce-focus and communication channels. We will also need to pay attention to barriers for rural women, such as the lack of land titles and consequent difficulties in accessing credit. Insurance can play an even larger role here than hitherto. Based on our initial experiences in Sudan and Cambodia, we will assess possible intensification of our work on financial education and inclusion.



Given the calls for greater food safety and traceability, SFSA will examine the options for stepping up GAP training for smallholders and for improving their post-harvest management. Measures here include the expansion of cold storage as well as R&D support for breeding less-perishable vegetables. In pursuit of more nutritious food, we will also examine the options for picking up again on earlier R&D involvement in biofortification. All such initiatives will include the search for appropriate partners.

In Policy, we will continue to press for a more conducive environment for smallholder prosperity. Further studies and increasing advocacy are required here, for example in support of smallholder access to digital technologies. Food safety policy work could usefully include advice on the avoidance of future pandemics originating in agricultural markets. In response to Covid-19, we will collect, analyse and act on the lessons and advice from our country teams. These relate both to emergency response and to improving smallholder resilience to similar future challenges.

Such changes cannot, however, all simply add work to our current programs without other alterations. In 2021-25, SFSA will carefully consider its use of resources and the options for starting the new thrusts mentioned above. This requires assessment of where we will reduce or end other work, as well as the need for additional partnerships and resource mobilization. This latter topic is dealt with in a separate paper.



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