

## Transformative changes of agriculture and food systems

*By the Thematic Group on Sustainable Agriculture and Food Systems \**

It is hard to exaggerate the role that agriculture plays in human development. From providing basic sustenance to employing millions of farmers worldwide, agriculture is a fundamental part of almost all societies and economies. Yet, agricultural systems must adapt, even transform, to meet a growing number of challenges and constraints. This transformation is crucial for achieving many of the post-2015 SDGs.

### ***An agricultural transformation***

One-third of Earth's land is devoted to agriculture, more than any other industry. Yet the agricultural sector struggles to keep up with a growing global population and the demands of an expanding middle class. Estimates are that we will need to increase food production by 60-70% by 2050; many developing countries may even have to double food production<sup>1,2</sup>.

In addition agriculture must reduce the pressure placed on the environment, including land degradation, water depletion, pollution, unbalanced nutrient cycles, greenhouse gas emissions, and threats to bio-diversity. Climate variability and climate change are complicating factors that will likely exacerbate food insecurity in areas already suffering from poverty and hunger<sup>3</sup>.

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Maximizing agriculture's potential to reduce rural poverty is another challenge, particularly in South Asia and Sub-Saharan Africa. Farm sizes are shrinking as populations grow, and inequalities in land tenure and access to resources are pervasive. Efforts to increase farm productivity, improve access to markets, and subsidize inputs may even contribute to inequalities by favoring farmers with greater access to resources and capital. Reducing rural poverty requires long-term agricultural and economic growth that prioritizes the needs of the poor, including creating new job opportunities for people in rural areas.

Societies must leverage agriculture to meet health and nutrition goals, for example through crop diversification and higher food quality. More than 840 million people are still chronically undernourished<sup>4</sup>. Two billion people face micronutrient deficiencies that inhibit mental and physical development. Stunting affects 165 million children, while at the same time obesity is a growing phenomenon that takes a huge toll on health and societies<sup>5</sup>.

Devising long-lasting solutions will require deep, "structural transformations" in the agriculture sector. In developing countries, the agricultural sector must adapt new technologies and business models to increase job opportunities, overcome resource constraints, enable greater market participation, and reduce ine-qualities, particularly for women. Agriculture in developed countries must address unhealthy diets, food waste, biofuel production, and how their policies impact low- and middle-income countries. These countries must take the lead in implementing higher standards for productivity, resource efficiency, food safety, and environmental impacts.

The alternative of a business-as-usual trajectory has severe implications for food and nutrition security, public health, economic growth and prosperity, social wellbeing, and natural resources and biodiversity, in every region and in every country. Without new strategies, political commitment, and coordination of

actors in the agriculture and food sector, many countries will forgo opportunities.

### ***Rethinking smallholder agriculture***

An additional 10-15 million young people look for jobs in rural areas every year. They could ignite the structural transformation presented above for a lasting and sustainable growth in productivity.

Smallholder farms are a crucial part of national food systems and economies, and will play a large role in the sustainable food systems of the future. However, unlike farmers with large holdings, smallholders may lack capital and other resources, legal rights and tenure, access to markets, and access to agricultural extension services<sup>6</sup>.

Female smallholder farmers face even greater barriers to success, despite the fact that they comprise half of smallholder farmers in East and Southeast Asia and Sub-Saharan Africa. Fortunately, with access to the same inputs, women often produce yields 20-30 percent greater than men<sup>7</sup>. Empowering and encouraging women is not an opportunity we can afford to miss.

Other shifts can improve productivity, profitability, and sustainability. Increasing the share of rural household income that comes from non-farm sources acts as an insurance policy against environmental and economic shocks by spreading risk and reducing reliance on agriculture, ultimately reducing poverty and increasing food security. One example is small-scale, rural food processing plants, which could also help reduce food loss and increase food quality, for both safety and nutrition.

Investments in rural infrastructure, especially roads, electrification, and telecommunications are essential to increase access to markets, reduce food loss, and improve storage and handling. Good governance is key to ensuring fair access to resources, markets, and new technologies. Strengthening farmers' entrepreneurial and management skills will increase farm value and reduce threats to productivity and profitability.

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As countries urbanize and rural labor availability declines, consolidating farms or farm services and increasing mechanization is one way to maintain or raise production<sup>8</sup>. Ultimately, for many farmers and their families, the best way forward is to move out of farming as better opportunities arise.

### ***Major elements of sustainable agriculture and food systems***

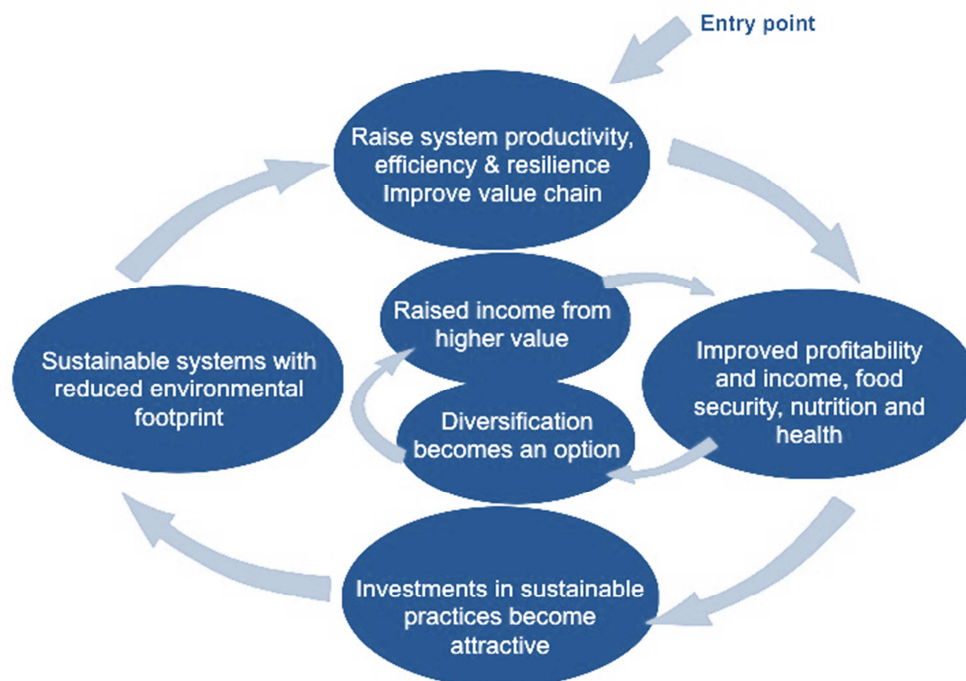
A new global framework for the sustainable development of agriculture and food systems is essential to increase food availability and utilization, improve human health, create more prosperous rural communities, and rejuvenate the environment. Solutions must address population growth, food consumption, food production, and food loss.

One significant element is shifting toward healthier diets and reducing food waste and loss. In rich and poor countries consumption of energy-dense, processed and refined foods is rising, with negative impacts on both health and resource use. Dietary behaviors need to change to be healthier and more sustainable, while respecting cultural differences.

As much as one-third of all food grown may be lost or wasted from farm to fork<sup>9</sup>. Today it is unclear how much can realistically be improved, and we do not know whether "recovered" food would reach those in need. Investments in research are urgently needed to guide future action.

Addressing these challenges requires Sustainable Intensification of Agriculture (SIA) around the world<sup>10</sup>. SIA aims to reduce the environmental footprint of agriculture while meeting all its other social and economic goals. This means higher yields of nutritious food on existing farmland rather than farmland expansion; ensuring food is accessible to all; preventing damage to natural resources and biodiversity; respecting and protecting the health and wellbeing of people, animals, and the environment; and maintaining these principles now and in the future. It requires tailored strategies and solutions at the national level.

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**Figure 1** Enhancing system productivity and value is the entry point for enabling farmers to enter a virtuous circle of sustainable agricultural production and

SIA is a core requirement of "climate-smart agriculture", which unites the goals of the agriculture, development, and climate communities<sup>11</sup>. The practical implications of climate-smart agriculture are still being debated, as difficult trade-offs undoubtedly exist between activities to intensify agricultural production, mitigate risks, and adapt to climate-induced shocks.

### ***Diverse pathways to sustainable development***

Transformative changes are needed in all countries, but the priorities and timing of implementation will differ according to local contexts. Simplistic, universal prescriptions or recommendations will not work; instead, successful models are flexible and built on local knowledge. However, the principles of SIA can be applied to any food production system, including farms of different sizes and degrees of market integration, and will particularly benefit resource-limited, smallholder farms.

Collaboration will be critical for success. We need to provide farmers, agricultural professionals, agribusinesses, scientists, and local policy makers with the necessary information, resources, tools, and recognition, as well as the space to meaningfully cooperate.

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