

# Transforming Food Systems Under a Changing Climate

## Adaptation and development pathways for different types of farmers: key messages

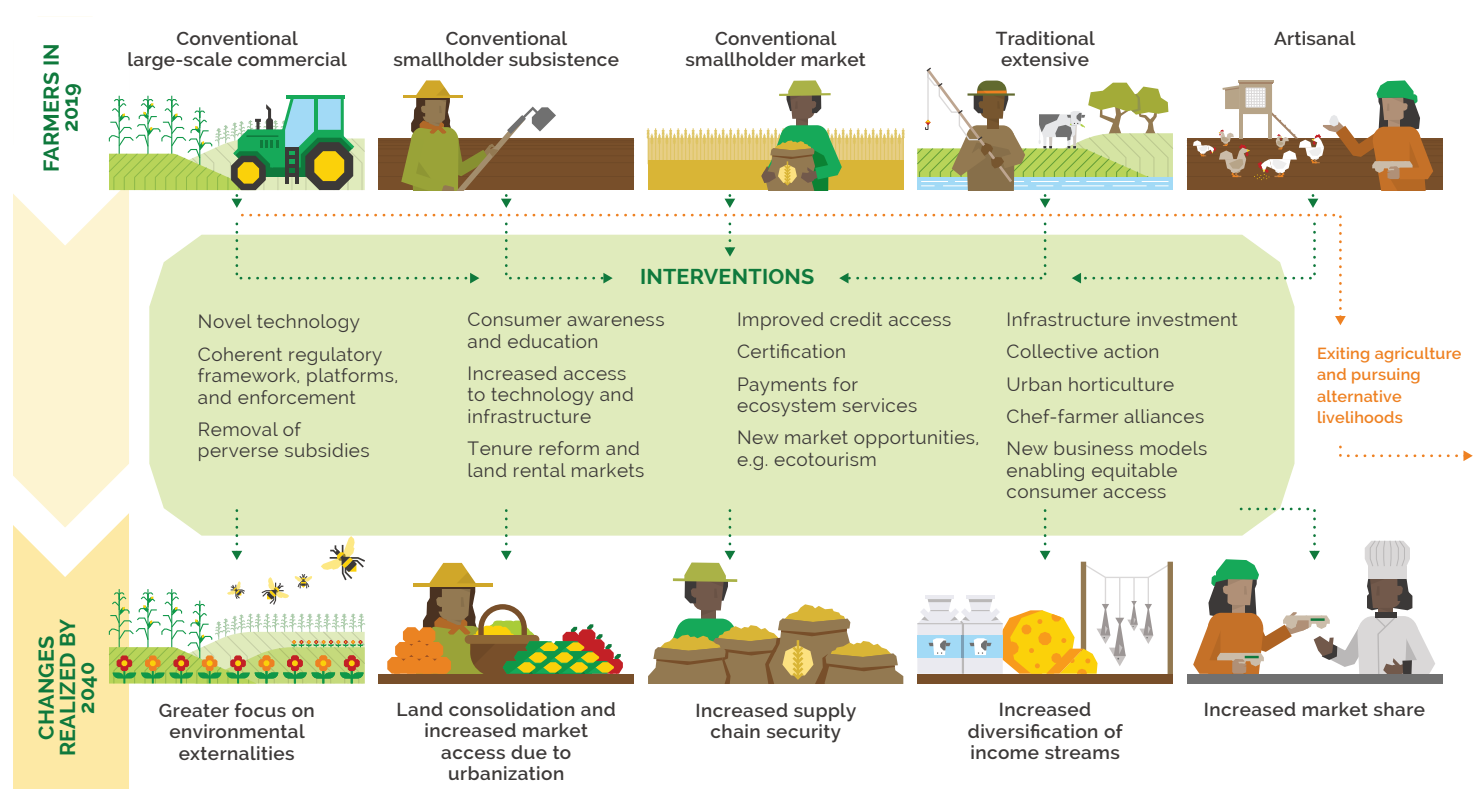
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JUNE 2019

### Transformation is inevitable, but there are no silver bullets

1. "Business as usual" agriculture in 2040 is not an option for meeting basic human needs on a planet with intensifying climate change impacts and 2 billion more people than in 2018.
2. There are many different types of farmers, therefore development pathways to reach SDGs and the Paris Agreement need to reflect this: no single transformation pathway will be appropriate in all situations, and it is difficult to generalize from one farmer to another.
3. Global trends, such as population growth, climate change, rapid urbanization, dietary changes, competing land uses and the emergence of new technologies will shape development pathways, and these impacts will vary between types of farmer pathways.
4. Pathways further need to ensure that environmental, economic and social-cultural benefits are not compromised, now or into the future. We need pathways that will protect biodiversity, decarbonize the economy and keep humanity within a safe operating space.

### EXAMPLES OF TRANSFORMATIONAL PATHWAYS FOR DIFFERENT KINDS OF FARMERS



## EXAMPLES OF DISRUPTORS WITH THE POTENTIAL TO ACCELERATE FOOD SYSTEMS TRANSFORMATION



Global carbon pricing mechanism



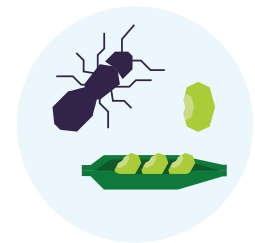
Genetic engineering of photosynthesis



Vertical agriculture



Universal basic income



Dietary shift towards new protein sources

### Small farms may no longer be viable in many contexts

5. The most viable pathway for some farmers may be to exit agriculture: Of about 570 million farms in the world [1], 85% are less than 2 ha and occupy only around 12% of global agricultural land. Even with best-practice farming, such small farms are financially unviable [2]. Farmers with less than 2 ha of land are unlikely to prosper, no matter how productive they become [2], and meaningful poverty reduction will not come from increasing crop and livestock output alone [3]. Rare exceptions are capital-heavy practices like glasshouses producing high-value crops and intensive livestock production.
6. Different pathways for sustaining food production while minimizing climate change impacts may mean smallholder and traditional farmers become more like artisanal farmers with a greater market share by 2040. This shift would be coupled with much closer producer-consumer connections through shorter supply chains and larger areas under more environmentally friendly production. Changes can be supported by rental markets and consolidation, possibly through cooperatives, aided by collective action and co-evolving technology for the different farmer types.

### Disruptive actions are key to accelerate progress

7. Disruptions such as vertical farming, universal basic income, alternative protein sources or what has been called the fourth agricultural revolution can accelerate some transformation pathways.
8. Policies for transformation must go beyond

developing secondary and tertiary industries in rural areas to also providing crucial support for people exiting rural agriculture and moving into urban livelihoods. Ensuring food production does not decline requires parallel investments in agricultural niches and re-skilling of the workforce for activities like vertical agriculture, urban agroforestry and small-scale processing. These investments should be aligned with dietary shifts and the implementation of sustainable food security strategies.

9. Subsidies for monocultures and other perverse incentives that undermine environmental quality, should be replaced with incentives that substantially reward pro-sustainability behaviours. Incentives are needed alongside more stringent implementation of polluter-pays principles and carbon taxes within the food system.

Read the working paper: [http://bit.ly/TFSI\\_Pathways](http://bit.ly/TFSI_Pathways)

### References

1. Lowder SK, Scoet J, Raney T. 2016. The number, size, and distribution of farms, smallholder farms, and family farms worldwide. *World Development* 87:16–29.
2. Harris D. 2019. Intensification Benefit Index: How much can rural households benefit from agricultural intensification? *Experimental Agriculture* 55 (2):273–287.
3. Wichern J, van Wijk MT, Descheemaeker K, Frelat R, van Asten PJA, Giller KE. 2017. Food availability and livelihood strategies among rural households across Uganda. *Food Security* 9 (6):1385–1403.

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### About the Transforming Food Systems Under a Changing Climate Initiative

This briefing is part of Transforming Food Systems Under a Changing Climate, an initiative led by the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) that aims to realize a transformation in food systems by mobilizing knowledge and catalyzing action. The initiative brings together leaders in science, business, farming, policy and grassroots organizations to identify pathways for transformation. To find additional publications in this series and for more information, please visit: <http://bit.ly/TransformingFood>.

### About the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

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