

Modern agriculture has many complex challenges

Note: This is an edited version of the following article - see the link below for the full version.

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Farming is a complex, unpredictable and individual business.

Farmers must meet the changing needs of our planet and the expectations of regulators, consumers, and food processors and retailers.

There are increasing pressures from climate change, soil erosion and biodiversity loss and from consumers' changing tastes in food and concerns about how it is produced. And the natural world that farming works with – plants, pests and diseases – continue to pose their own challenges.

While modern agriculture provides a large number of solutions, the outcome is not always the same because each farm is unique: different landscapes, soils, available technology and potential yields.

What kind of problems do farmers face?

Farmers need to deal with many problems, including how to:

- Cope with climate change, soil erosion and biodiversity loss
- Satisfy consumers' changing tastes and expectations
- Meet rising demand for more food of higher quality
- Invest in farm productivity
- Adopt and learn new technologies
- Stay resilient against global economic factors
- Inspire young people to stay in rural areas and become future farmers

Farmers must adapt to climate change

The effects of climate change affect farmers' ability to grow the food we all need. Increasingly volatile weather and more extreme events – like floods and droughts – change growing seasons, limit the availability of water, allow weeds, pests and fungi to thrive, and can reduce crop productivity.

Soil erosion is reducing the amount of land available for agriculture, and declining biodiversity affects the pollination of crops. At the same time, farmers are under pressure to conserve water and use fewer agricultural inputs.

As they adapt to these changes, farmers also need to mitigate the greenhouse gas emissions contributed by agriculture through adopting climate-smart practices – a new learning journey for many.

Land - Only 12% of the world's land can be used for farming

Emissions - Agriculture, forestry and other land use causes 23% of greenhouse gas emissions

Water - Farming uses 70% of the world's fresh water

Biodiversity - 84% of crop species in the European Union depend at least partly on pollination by wildlife

Consumer needs and expectations drive the food value chain

Farmers need to meet the rising demand for more food of higher quality. In recent years, there has been a shift in focus from concern about 'enough food' to 'good food'. Society has rising expectations of farmers to reduce their impact on the environment, to increase the nutritional content of crops and to further minimize chemical residues in crops and the environment.

Farming is a business

Agtech is raising crop productivity, but farmers need to invest in such technology, from treated seeds and crop protection products to data-analysis apps and precision spraying. While large-scale farmers may be able to afford to invest, smallholders don't always have access to an affordable source of credit. And then farmers must learn how to best use these technologies to improve their business.

A farmer's business decisions are complicated by global economic factors, like fluctuating commodity prices and trade issues, and the fact that a harvest can be affected by weather, insects or disease.

There's also the question: who is going to farm in the future? As millions of people from rural areas migrate to cities each year, farmers need to inspire enough of them to remain and build a career in agriculture.

70% more food will be needed by 2050 to feed a growing population

80% of food for the developing world is produced by smallholders

700% higher crop yields are produced in north America than in sub-saharan Africa

180,000 people leave rural communities every day to live in cities