



Briefing

The world faces interrelated challenges of climate change, food security, and agriculture.

Agriculture generates a quarter of global emissions, second only to energy. At the same time, farmers are increasingly vulnerable to climate change, which has already reduced agricultural productivity. Continued climate change now threatens to accelerate alarming trends: growth in agricultural productivity has slowed while demand for food has grown, driven by continued population growth and rising incomes. In 2021, an estimated 924 million people experienced severe food insecurity, an increase of over 70 million from 2020 and 360 million from 2014.

Innovation can help address these challenges and accelerate food systems transformation.

Many steps will be needed to mitigate emissions and adapt to climate change, but innovation can play an important role and will be the focus of the Commission. We see innovation both as a complement to other needed policy changes and as potentially facilitating those changes by making it easier for individuals, firms, and governments to adopt policies to address the interlinked challenges of climate change, food security, and agricultural productivity. In the energy sector, rapid reductions in the price of solar power and batteries illustrate the potential of innovation. In agriculture, several trials have found that adding a type of seaweed to livestock feed can improve productivity while reducing methane emissions by over 80%. Flood resistant rice varieties have been developed, producing 45% higher yields under flood conditions.

Further innovation is needed for climate mitigation in agriculture. We need investments in innovation that mitigate emissions from agriculture. This includes both technological innovations, such as crops designed for greater nitrogen fixation to lessen the need for fertilizer or with roots that capture more carbon, and social innovations, such as payments for ecosystem services.

We also need innovation to support adaptation. Farmers, particularly smallholders in low- and middle-income countries, are among the most vulnerable to climate change. Innovations to boost their resilience could include technological innovations such as seed varieties with drought or flood-resistant traits, improved weather forecasts (for example for monsoon onset), and digital extension systems that help farmers access these forecasts. They also include social innovations, such as climate-responsive cash transfers to boost resilience and address food security.

However, commercial incentives to develop and scale innovations often fall far short of social needs, leading to under-investment under existing institutions. The market will not generate adequate investment in mitigation, as cutting emissions is a public good and consumers do not pay prices reflecting their impact on the global climate. The private sector may also underinvest in adaptation innovations that are hard to commercialize. This creates a strong rationale for public support for innovation.

Healthy innovation systems need both push and pull mechanisms. Push mechanisms provide direct up-front support for research. Examples include grants for basic science; directed research efforts; and open, tiered, evidence-based social innovation funds, such as France's Fund for Innovation Development (FID) and Development Innovation Ventures (DIV) at USAID. As well as push, we need pull mechanisms to harness the energy and creativity of the private sector. For example, the pneumococcal Advance Market Commitment, which committed to help finance the purchase of vaccines covering strains common in low- and middle-income countries once they were developed. This approach limits the risk to funders by rewarding innovations only after they have proven to be successful. Pull mechanisms are also designed to help innovations reach the necessary scale by incentivizing the private sector to produce larger quantities at lower prices in ways that increase both incentives for innovation and overall social welfare. Similar efforts could be pursued to promote innovations at the intersection of climate and agriculture.

The Role of the Innovation Commission for Climate Change, Food Security and Agriculture

While there is growing recognition among experts that innovation is necessary to address climate change, many funders may require a strong economic case to make sufficient investments. The increasing relevance of the challenge is evidenced by a growing number of initiatives, like the Agriculture Innovation Mission for Climate and Agriculture Breakthrough, and a more prominent role of food systems in COP28. However, the conversation needs to expand beyond the agriculture sector to address the concerns of finance ministers and policymakers who make budget decisions.

The Innovation Commission encourages innovation development and scaling at the intersection of climate change, food security, and agriculture. The Commission identifies high return investments in innovation for climate mitigation and adaptation in agriculture and food security. In many cases, even once innovations have been developed, market or government failures prevent them from reaching an efficient scale. The Commission identifies such barriers and proposes institutional mechanisms to efficiently stimulate innovation and take the most effective ones to scale. It also examines the role of meta-innovations: mechanisms for encouraging innovation development and scaling, such as open, tiered, evidence-based social innovation funds, and Advance Market Commitments for climate change, food security, and agriculture.

The Commission brings together an independent, diverse, and high-level group. This includes former heads of state and cabinet ministers, and leaders in international organizations and the private sector. The Commission is chaired by Michael Kremer, the co-recipient of the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel in 2019. His work on Advance Market Commitments was instrumental in the adoption of this approach as a tool for promoting private sector participation in the development of health innovations for low- and middle-income countries, and he helped establish USAID's Development Innovation Ventures.

The Commission Secretariat draws on published knowledge as well as consultations with experts from academia, government, the private sector, international organizations, and civil society. Over the next three years, the Commission will generate concrete proposals to develop and scale innovations, based on a careful assessment of available scientific and economic evidence, and engage with a range of stakeholders to disseminate and amplify this work.