



CLIMATE CHANGE AND FOOD SECURITY

Climate change is a critical challenge for food production around the world. As carbon dioxide concentrations rise, global temperatures are increasing, precipitation patterns are changing, and ocean acidification is on the rise. These changes are already affecting agriculture and food security directly. Feed the Future, the U.S. Government's global hunger and food security initiative, is working in concert with the U.S. Global Climate Change Initiative to develop strategies and undertake research to help food producers both reduce greenhouse gas emissions and adapt to climate change so that food security can be increased despite changing climate patterns.



Credit: Bijay Gajmer

The economies of many rural communities throughout the developing world depend on rain-fed crops, fisheries, and livestock herding – sectors that are all heavily affected by changes in climate. Feed the Future's efforts emphasize the importance of results-driven action, integrate environmental considerations into investments, and develop the capacity of partner countries to effectively manage their natural and agricultural resources and proactively adapt to environmental challenges.

Climate-Smart Food Security

Feed the Future's research strategy promotes a model for agriculture-led economic growth called "sustainable intensification," which integrates environmental approaches, global research breakthroughs, and innovative practices, systems, technologies, and policies to maximize long-term agricultural productivity while minimizing environmental impacts from food production.

Plant Breeding and Technology

As the world's population grows, farmers are increasingly challenged to produce more food with less land, fewer inputs, and changing water availability, under unfamiliar and unpredictable conditions. Agricultural areas all over the world are subject to decreased productivity caused by disease and pest infestations that can lead to food shortages. These diseases and pests are spreading more rapidly into new geographic areas due to changing climate and increased resistance to existing controls, in combination with an increasing frequency of international travel. Many agricultural communities are also experiencing severe weather events that did not historically affect their areas, such as droughts and floods. Resilience to such environmental changes is urgently needed to sustain agricultural production in changing climates around the world, particularly where farming conditions are already marginal or social safety nets are weak.

Feed the Future's crop research projects are making important steps toward resilience by identifying ways to breed seeds that incorporate tolerance to disease, heat, and drought to increase production while maintaining or improving the nutritional quality of food. Feed the Future is also examining systems of crop and animal production in developing countries to help ensure that management methods, adoption of best practices, and other techniques to increase resilience are incorporated at each step in the "value chain" of food production – from farm to table.

Soil and Water Management

Water is critical to every agricultural production system. Evidence indicates that rainfall variability is a greater challenge to farmers than the total amount of available rain, making water management a key element of increasing food productivity. The impacts from rainfall variability in Africa may be exacerbated by the quality of Africa's soils, the majority of which are heavily weathered, often with limited capacity to retain moisture or provide the nutrients necessary to sustain crops and pastures.

Feed the Future investments will incorporate integrated watershed management and practices that balance water and other resource use into linked climate change adaptation and food security strategies to help upstream and downstream users in both agricultural and urban landscapes. Managing water at the watershed level reduces the risks from floods, droughts, soil loss, seasonal water loss, over-extraction of aquifers, and disruption of water flow/regulation and environmental services that are necessary for productivity and food security. Managing rainfall at watershed scales has also been shown to help recharge water tables. Increased water availability contributes to greater productivity and resilience and provides more diversified sources of livelihoods by increasing the ability to grow nutritious foods in home gardens for household consumption well into dry seasons with the help of higher water tables. Feed the Future will also invest in regenerative soil health strategies and examine land tenure systems and other policies in order to help ensure that soil and water can support agricultural production in the long term.

Protecting Livestock and Fisheries

In Feed the Future focus countries, fish and livestock are critical to communities, livelihoods, nutritional status, and economic development. Globally, the livestock sector employs 1.3 billion people and contributes up to 50% of global agricultural GDP. By 2025, global meat demand is expected to grow by almost 40%. Fish constitute a significant portion of animal protein intake for more than 2 billion people in developing countries. In addition to their high protein content, fish provide a wide variety of vitamins and minerals, making them a highly nutritious dietary component, even in small quantities.

Feed the Future recognizes that animal-source foods such as meat, poultry, fish, eggs, and dairy constitute a significant portion of the agricultural sectors in our focus countries. Just like crops, these animal sources are subjected to threats from changing climate, including severe weather events, food scarcity, ocean acidification, and the increasing spread of infectious diseases. Feed the Future is looking for opportunities to increase productivity and reduce vulnerability by undertaking research to prepare livestock producers to adapt. For example, Feed the Future scientists are currently working on improving livestock production in the United States and abroad by studying emerging infectious diseases in the animals.

Meeting the Global Challenge

Climate change will bring many new challenges to the agricultural sector. With cutting-edge research and innovative programming supported by Feed the Future and its collaborators around the world, we hope to meet these challenges and feed our growing population. By increasing the resilience of crops, fisheries, livestock, and people and investing in agricultural research and strategies today, Feed the Future is contributing to the growth and resilience of the global food supply tomorrow.

Did You Know?

- About **2.5 billion** people's livelihoods depend directly on climate-sensitive economic activities such as agriculture and fisheries
- The global population is expected to reach **9 billion by 2050** – a 30% increase
- Agricultural production will require a **70% increase** by 2050 to provide enough food for the world's growing population