PROGRAM FOR SUSTAINABLE INTENSIFICATION

The Feed the Future Food Security Innovation Center leads USAID's implementation of the Feed the Future Research Strategy through seven interlinked research, policy and capacity programs aimed at sustainably transforming agricultural production systems. Visit www.feedthefuture.gov/research to learn more.

Until now, much of agricultural growth in the developing world, especially in Sub-Saharan Africa, has been driven by the continuous expansion of land under cultivation. Globally, agriculture is spreading to marginal lands ill-suited to grow crops, and water availability is becoming a major constraint.

A new approach is needed to meet the world's food needs – **sustainable intensification** – that harnesses advanced technologies developed with a deep understanding of how they will work together with local agroecological systems to produce more and better food for growing populations, stimulate economic growth, and build resilience, while using fewer natural resources.

To achieve these goals, the ***Program for Sustainable Intensification*** works with smallholder farmers and global, regional and national research partners to identify and adapt promising strategies and technologies for local farming systems, in order to intensify and diversify major production systems where the poor and undernourished are concentrated.

DID YOU KNOW?

- **African cereal yields are less than half the global average, roughly 1,300 kilograms per hectare.**
- **Climate variability will significantly reduce the gains in crop yields achieved with improved crop varieties and management practices across large areas of Africa and South Asia in coming decades.**
- **Low-yielding, smallholder farming systems often utilize less than 30 percent of annual rainfall; the rest runs unused from the farm field, washing away soil and important plant nutrients.**
- **Of the 11 percent of the world's land surface that is suitable for agriculture, 38 percent has become degraded by poor natural resource management. The problem is particularly acute in Africa, where up to 65 percent of agricultural land suffers from physical degradation and nutrient depletion.**

RESEARCH AREAS

Diversifying Major Production Systems – By integrating legumes, vegetables, trees, fish and livestock into cereal cropping systems, researchers are helping farmers improve soil fertility, diversify their diets, reduce the risk of crop loss to pests or disease, and create new income opportunities. Areas of research include intercropping, integrated pest management, on-farm testing of improved crop varieties, and household-level evaluation of new technologies.

Improving Soil and Water Management – Improved management methods are needed to help small farmers make better use of scarce water and ensure that agricultural intensification does not degrade natural resources. Areas of research include agroforestry, conservation agriculture, small-scale irrigation, targeted fertilizer application, small-scale machinery, and modeling of farm systems to inform the selection, targeting and widespread adoption of appropriate technologies.

Addressing Socioeconomic Factors that Affect Farm-level Profitability and Adoption of New Technology – Research activities are aimed at making sustainable intensification strategies relevant and accessible to smallholder farmers operating within a variety of agro-ecological, economic and social contexts. This includes engaging farmers in participatory research to address local challenges such as market access, seed and input availability, environmental constraints, and cross-cutting issues such as gender and climate change.

RESEARCH IN ACTION

Systems research led by the Cereal Systems Initiative for South Asia (CSISA), a program jointly supported by USAID and the Bill and Melinda Gates Foundation, has resulted in the development of more sustainable agricultural practices, which have now been adopted by millions of farmers. Recently, CSISA distributed new, high-yielding, stress-tolerant rice varieties to more than 100,000 farmers in Bangladesh. Additionally, 35,000 farmers participated in community demonstrations on integrated technology approaches and 5,000 farmers received in-depth technology training. These efforts helped introduce new cropping technologies, machinery, and resource- and labor-saving management practices on an estimated 20,000 hectares across Bangladesh. Across South Asia, CSISA aims to help six million smallholder farmers achieve higher yields and conserve valuable resources, resulting in an additional five million tons of grain and $1.5 billion in additional income each year.

PARTNERS

Universities – Specialists from U.S. and partner universities contribute technical expertise to research efforts, particularly through the U.S. university-led Feed the Future Innovation Labs. These programs facilitate field research in partner countries, build understanding of sustainable intensification technologies and provide crucial training opportunities for host country students and scientists.

National Research Partners: Partners from national agricultural research systems in Feed the Future focus countries contribute a wealth of knowledge about country conditions and opportunities for new component technologies to contribute to local farming systems. National scientists' understanding of the natural resource, institutional and market contexts are essential to designing system-level research on intensification.

Private Sector – We partner with local entrepreneurs and input dealers in our research activities to help ensure that smallholder farmers will have continuing access to new market opportunities and to commercially provided improved seed, fertilizer and agricultural tools.

International Institutions – International research organizations, particularly member institutions of the CGIAR, bring vital research expertise and infrastructure to the program's sustainable intensification efforts, as well as facilitating strong links to national research centers in partner countries.

Non-Governmental Organizations – NGO partners often execute the technology delivery and agricultural extension efforts that translate promising research into on-farm results.

Local Communities – The program's participatory research-for-development approach emphasizes a collaborative model of agricultural innovation, with local farmers, agricultural entrepreneurs, and extension officials playing key roles in research implementation and evaluation.

RESEARCH IN ACTION

Africa RISING is Feed the Future's sustainable intensification program in Sub-Saharan Africa. At each research site, international, national and local partners work in consultation with local farmers to design and test integrated technology combinations in key cereal production systems. A single research site might incorporate legume rotations, fertilizer trees, improved cereal varieties, small ruminants, reduced tillage practices, water management technologies, and small-scale mechanization.

Each intervention is evaluated for its contribution not only to agricultural productivity, but also to broad environmental and development goals such as improved labor budgets for women, better nutrition for families, higher water infiltration and retention for soils, higher incomes, and greater resilience to market and climate fluctuations.

Current Research Projects	Lead Institutions	Countries
Africa Research in Sustainable Intensification for the Next Generation (Africa RISING)	International Institute for Tropical Agriculture, International Livestock Research Institute, International Food Policy Research Institute	Ethiopia, Ghana, Malawi, Mali, Tanzania, Zambia
Cereal Systems Initiative for South Asia (CSISA)	International Maize and Wheat Improvement Center	Bangladesh, India, Nepal
Feed the Future Innovation Lab for Integrated Pest Management	Virginia Polytechnic Institute	Bangladesh, Burma, Cambodia, Ethiopia, Kenya, Nepal, Tanzania, Vietnam
Feed the Future Innovation Lab for Sustainable Intensification	Kansas State University	Bangladesh, Cambodia, Tanzania, Ethiopia, Burkina Faso, Senegal
Feed the Future Innovation Lab for Small-Scale Irrigation	Texas A&M University	Ethiopia, Ghana, Tanzania
Virtual Fertilizer Research Center	International Fertilizer Development Center (IFDC)	Global
CGIAR Research Program-Aquatic Agricultural Systems	World Fish Center	Global
Water and Livelihoods Initiative	International Center for Agricultural Research in the Dry Areas	Egypt, Iraq, Jordan, Lebanon, Palestine, Syria, Tunisia, Yemen
Revitalizing the Central American, Caribbean and Peruvian Coffee Sectors after the Rust Crisis of 2012 through Applied Research and Development	Texas A&M University and World Coffee Research	Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru

Feed the Future Food Security Innovation Center

The Program for Sustainable Intensification works with smallholder farmers to incorporate sustainable, productivity-enhancing technologies and farming practices into major production systems where the poor and undernourished are concentrated and, through intensification and diversification of these systems, to enhance resilience, nutrition and agricultural growth.

The Feed the Future Food Security Innovation Center leads USAID's implementation of the Feed the Future Research Strategy through seven interlinked research, policy and capacity programs aimed at sustainably transforming agricultural production systems. It is housed within the Bureau for Food Security and is a strategically aligned and integral component of USAID's science and technology programs. The seven programs of the Food Security Innovation Center are:

- **Research on Climate Resilient Cereals** – This program helps smallholder farmers adapt to climate change and build resilience by developing new cereal varieties with enhanced yield and tolerance to drought, heat, salinity and low soil fertility, and delivering these varieties in diversified, sustainable farming systems.

- **Research on Legume Productivity** – This program increases the production and consumption of critical, protein-rich legumes by developing disease- and stress-tolerant, high-yielding varieties, improving market linkages and post-harvest processing, and integrating legumes into major farming systems to improve household nutrition and incomes, especially for women.

- **Advanced Approaches to Combat Pests and Diseases** – This program harnesses U.S. scientific expertise and emerging molecular tools to develop new animal vaccines and crops and animals resistant to pests and diseases that cause significant production losses in tropical systems.

- **Research on Nutritious and Safe Foods** – This program links research on the production and processing of safe, nutritious agricultural products to a learning agenda on household nutrition, including the utilization of and access to fruits, vegetables, meat, fish, dairy and legumes with the goals of preventing undernutrition (especially in women and children), improving child survival and securing family investments in agriculture.

- **Markets and Policy Research and Support** – This program works to achieve inclusive agricultural growth and improved nutrition through research on enabling policies, socioeconomics and technology targeting, and by building the capacity of partner governments to effect sustainable change in areas such as land tenure, financial instruments, input policies and regulatory regimes.

- **Human and Institutional Capacity Development** – This program strengthens individuals – scientists, entrepreneurs, educators – and institutions, ensuring that food and agriculture systems in developing countries are capable of meeting the food security challenge and that women in particular are poised to take advantage of new opportunities and provide critical leadership in agricultural research, private sector growth, policy development, higher education and extension services.

Questions? Contact FTFinnovation@usaid.gov