

# Developing Food for the Future

Development assistance was once mainly monetary and material—financial resources to get a developing economy up and running, or the physical infrastructure nations needed to modernize society. Today, though, the focus is increasingly on the equally vital resource of knowledge. Through the Science and Technology Research Partnership for Sustainable Development (SATREPS), JICA supports collaborative research involving institutes in Japan and developing countries. The aim of SATREPS is to leverage Japan's science and technology prowess to tackle global issues and give back the tangible fruits of research to societies around the world.

## CONTRIBUTIONS TO FOOD SECURITY

One promising SATREPS collaboration is the Project for the Development of Wheat Breeding Materials for Sustainable Food Production in Afghanistan. Launched in fiscal 2010, this project brings researchers from Yokohama City University, RIKEN, and Tottori University in Japan together with counterparts from the Ministry of Agriculture, Irrigation, and Livestock. The goal is to refine the germplasm of wheat to enhance its genetic tolerance for drought, unfavorable soil, and disease for production in Afghanistan. By crossbreeding local wheat with high-quality external strains, the project is working to develop new varieties that can be grown at low cost, even in harsh conditions. It also trains young researchers, a vital step to ensure sustainable production into the future.

The principal investigator in Japan is Professor Tomohiro Ban of Yokohama City University's Kihara Institute for Biological Research. In his work he coordinates closely with the research institute RIKEN, which possesses top-flight gene-analysis technology, and Tottori University, with its solid track record in research on arid climates.

Afghanistan was once a lush agricultural country boasting 100% self-sufficiency in wheat. Decades of conflict have devastated the land and the agricultural industry, though. Valuable genetic resources have not been preserved, and systems for breed improvement have fallen apart. Varieties brought in from abroad have not helped increase the low yields in regions lacking proper irrigation. By developing new or improved breeds utilizing natural biodiversity, the project aims to rebuild the foundation for grain production in these harsh conditions. The achievement of wheat that can grow in such an environment will help avert food crisis in the short term and contribute to the nation's longer-range food security.



## A HOMECOMING FOR TRADITIONAL GRAINS

Key to realizing the project were the genetic resources of local Afghan breeds that had been preserved at the Kihara Institute. In 1955, Kyoto University sent research expedition teams to the Karakoram and Hindu Kush regions of Afghanistan. These researchers collected some 500 local wheat varieties and their ancestral breeds, which they took back to Japan for preservation and study. They represent a rare set of genetic resources.

"These are plants that once grew in Afghanistan," says Professor Ban. "They have the strength to survive there. With breeds of Afghan origin, we have a good chance of developing new varieties that are suited to the local climate."

In the SATREPS project's first year, the preserved breeds were taken back to Afghanistan for cultivation. The team confirmed that these grains are still able to thrive in the Afghan soil and climate.

While increasing breeding fields in the country, the project is currently working to develop breeds that are resistant to drought and disease. Here the Japanese participants are putting advanced science and technology to work in analyzing the genomic information of the resources and crossbreeding traditional local varieties with modern ones from around the world.

SATREPS does not stop with technical work, though. The Kihara Institute accepts exchange students from Afghanistan as part of a long-term approach to improving the nation's self-sufficiency. "Developing human resources leads to country building," Professor Ban says. "I hope the students will not only learn the technologies but also study our ways of thinking."

Professor Ban (center) working with researchers at a test farm in Herat, western Afghanistan.



PHOTO: YUICHI ITABASHI

Professor Ban hopes Japan's assistance will bring stability and productivity back to the Afghan farming sector.