A new pilot project is enhancing children’s nutrition and food security in India by bringing Smart Foods to schools through the Akshaya Patra Foundation (APF)—the world’s largest meal provider to the underprivileged, serving 1.7 million free mid-day meals to schoolchildren throughout India each day. While many organizations are introducing healthier school meals, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and APF are employing a detailed scientific approach with their millet-based mid-day meal program. The partners are designing recipes that are easy to cook and that children will enjoy, while maximizing nutrient absorption, measuring health benefits, and more.

Smart Foods like millets, sorghum, and legumes are being used to target specific nutrient needs of malnourished children. While ICRISAT is leading this analysis, the pilot is also being made possible with support from the State Government of Karnataka and advice from the National Institute of Nutrition. This partnership program comes at a time when food insecurity, malnutrition, obesity, diabetes, and iron deficiency anemia are high in India, impeding good health and livelihoods. According to a recent study in the Journal of Clinical and Diagnostic Research, 50 percent of adolescent girls in India were anemic. To combat this problem, ICRISAT promotes traditional, micronutrient-dense grains, like millet, which can introduce significantly more iron, zinc, calcium, fiber, and protein into Indian diets.

The new mid-day meal program will start by serving Smart Food-based meals each school day to 800 schoolchildren in two schools in peri-urban areas, targeting children 11-14 years old—ages of significant cognitive and physical development with high iron requirements, especially for girls.

In a nearby village of Kagalipura, Bhagya Lakshmi complains that her daughter, Shivani, has skipped mid-day meals at school in the past. She hopes that this program will change that.

“Shivani prefers chapati (wheat bread) or dosa (rice pancake), so I pack her lunch every day; I don’t want my child to remain hungry. My sister has been recommending navane (foxtail millet), but I simply don’t know what to do with it. I really hope Shivani likes the taste of millets, and I will stop packing her lunch box!”

ICRISAT’s Smart Food nutritionist and senior scientist, Dr S Anitha, told Food Tank that the meals provided to students must meet specific nutrition criteria and provide balanced and easily absorbed sources of micronutrients, including calcium, iron, and zinc. Before serving meals in the lunchroom, the team had them tested in a lab to confirm their nutritional value. As part of the program, ICRISAT will also teach school staff to use cooking methods that will preserve meal nutrients.

To promote the program’s long-term viability, Dr. Anitha says that each meal will be cost-effective and sustainable on a low budget, while also palatable for schoolchildren. Currently, the program aims to serve millet-based sweet and khara pongal (traditionally, a south Indian breakfast dish with rice & lentils), as well as upma (a customizable porridge) and bisi bele bath meals (traditional hot lentil and rice dishes in Karnataka). The mid-day meal program will also evaluate the availability, seasonality, and local varieties of Smart Foods and other meal ingredients in the regions around the schools to effectively utilize local resources. Dr Anitha explains that ICRISAT will also assess options for “storage, purchasing in different locations, pre-prepared mixes,” and other techniques to maintain efficient meal service.

The final measure for this program is scalability, says Dr S Anitha; ICRISAT and APF will review “the ability to take the mid-day meal program across all of India, to other organizations, to other beneficiary groups, and other countries.” The partners will monitor the equipment and time needed for future schools to prepare the meals. ICRISAT is confident that this program can serve as a roadmap for other schools, providing a successful, sustainable, and scalable model to improve child health and school meals with Smart Food nutrition.
Empowered women and an enriched community – the groundnut story of northern Nigeria

Mrs Hadja Talatu Idrissa of Bunkure, near Kano, Nigeria, is the leader of a 25-women group in groundnut production and processing. They began to get involved with the Tropical Legumes III (TL III) project four years ago with a small seed pack of 5 kg each in their community farmland. From the harvest of this crop, they planted in a bigger farm plot the following year.

“From 1 hectare we harvested 25 bags of the improved variety SAMNUT 24, against 13 bags of the local variety harvested on the same plot,” says Mrs. Idrissa. After the harvest season, the group earned its first revenue from the haulms of the improved variety SAMNUT 24. “We sold the haulms of the improved variety for up to 30,000 Naira, against 12,000 Naira of the local variety,” explains Mrs. Idrissa. “The improved variety yields more haulms and is most appreciated for animal feeding for its better taste and digestibility.”

In 2017, the Bunkure women’s group produced about 3.5 tons of groundnut. As grain was used primarily for family consumption, the group sold groundnut haulms and used the money to start dry season groundnut production in 2018. “We don’t sell our grain produce. We keep it and process part of it into oil and many sub-products, which we sell. Out of the money made from the sale of processed products, individual members contribute 200 Naira each on a weekly basis in a savings box. The weekly savings of about 5,000 Naira is kept in the group bank account.”

From the interest earned on these savings, the group conducted many activities to help the community as a whole, including restoring the community health center and primary school. “We used part of our savings to clean up the community health center as well as to pay for basic products to sustain its regular functioning. Now the hospital is cleaner and offers a healthier working environment to its staff and patients. Earlier, people avoided visiting the hospital when they were sick, because the hospital was in such a bad condition. Nurses refused to stay overnight,” describes Mrs Idrissa. “Now that we have cleaned up the premises, they are no longer afraid to stay long hours in the hospital. In fact, the health center now offers 24-hour service and nurses are ready to attend to patients at any time of the day or night.”

Mrs Idrissa showing the legal document of the creation of the Bunkure women’s group in 2008 and a recognition of the Governor of Kano State for their contribution to the development of the community. Photo: A Diama, ICRISAT

To offer a full package, the women’s group contributed to repairing the beds in the hospital; this offered a more convenient place for patients, including for pregnant women. Apart from this, the group also contributed to restoring doors and windows of the community’s primary school.

According to Mrs Idrissa, the group has contributed to increasing and improving the education of children within the community of Bunkure. “Earlier, most of our children stopped schooling at primary level. Now, we have children going to universities in capital cities,” she says proudly. At a more personal level, Mrs Idrissa was able to attend the Hadj in Mecca in Saudi Arabia and is proud to see how much progress the women’s group has made from groundnut production and processing, and groundnut haulms. “I have a lawyer, a doctor and even an agricultural extension worker,” she says.

In a country where women’s access to land is still a major issue, Hadja Talatu Idrissa and many other members of the Bunkure women’s group are now the happy owners of their own farmland and of many bulls.

Happiness has different meanings to different people; Mrs Idrissa and the Bunkure women’s group seem to have reached their own goal of accomplishment. The Tropical Legumes project has put a smile on their faces which they gratefully translated into their community in many ways. The group was recognized in 2015 by the State Governor for their substantial contribution to the development of the entire community.

Click here to know more about ICRISAT’s work in Nigeria. Read about ICRISAT’s work on groundnut here.
Giving women their due: Case studies highlight importance of gender inclusiveness in breeding programs

While most crop and animal breeders realize the importance of considering gender differences in breeding programs, they lack actionable evidence and practical tools to help make their programs more gender-responsive. The CGIAR Gender and Breeding Initiative (GBI) recently published The Working Paper 3 State of the Knowledge for Gender in Breeding, a collection of case studies from across sub-Saharan Africa, Syria and China to help breeders develop a conceptual framework for gender analysis.

Ten case studies, highlighting the importance of giving weightage to women’s priorities in devising breeding plans for acceptable traits in crops/animals, were chosen from two CGIAR-conducted workshops in 2016 and 2017. These case studies illustrate that considering women’s needs, and partnering with them for implementation of programs can positively influence the success rate of the programs.

Dr Stephania Grando, Chair, Workshop Organizing Committee, and Honorary Fellow, ICRISAT, who co-authored and edited the paper, says, “Without convincing evidence — exemplified by case studies across commodities and countries — our arguments for gender-responsive research fall on deaf ears.”

The compelling cases not only demonstrate that men and women have different trait preferences, access to resources or opportunities, they also explain how breeding programs could address these issues.

In an agricultural science setup, successful and widespread adoption of new crop varieties by smallholder farmers depends on the benefits they provide to the men and women engaged in production, processing, marketing and consumption of the produce. Very often, the priorities of women with respect to the beneficial traits of a particular variety are very different from those of men.

For example, in Mali, when women were involved in post-harvest culinary tests and grain-quality evaluation of sorghum varieties, the results were surprising. As opposed to strictly agronomic qualities such as yield or grain size, the women rated traits such as grain color, loss during decortication, water absorption capacity, time taken to cook, etc. as high. “It became clear that farmers cannot adopt a variety that may have 10–20% more grain if its decortication losses are 10–20% more than those from the local variety,” noted the study. Factors such as storage losses, ‘flour-to-grit’ ratios, etc. also were seen to play a role in the popularity of a variety.

There are similar lessons to be learned from the other case studies involving different commodities, locations and projects. The authors of the paper hope that “Taking into account gender dynamics and sex-disaggregated preferences will make it more likely that farmers will adopt new varieties and breeds that will help strengthen food and nutrition security.”

The GBI is coordinated by the CGIAR Research Program on Roots, Tubers and Bananas (RTB) and the International Potato Center, with funding support from CGIAR fund donors.
Ten years and counting: Karnataka state reinforces ties with ICRISAT

ICRISAT’s long-standing collaboration with the government of Karnataka State, India, has enabled millions of farmers in the state to increase their incomes and improve their lives. Over a decade into this association, the two partners are looking to strengthen this partnership to reach more marginalized smallholder farmers.

Recalling the success of projects Bhoochetana, Bhoosamruddhi and Sujala, in which ICRISAT’s expertise has proved invaluable, Mr NH Shivashankara Reddy, Minister of Agriculture, Government of Karnataka (GoK), said, “The past ten years have been very constructive towards agricultural development in Karnataka with ICRISAT’s help. We want to continue this beneficial association to combat challenges that many farmers still face.”

Dr Peter Carberry, Director General (Acting), ICRISAT, cited the work in Karnataka as a perfect example of synergy, from upstream science to delivery of its benefits on the ground. “Based on the success of this, other states are also reaching out to us for similar support,” he said.

Mr M Maheshwar Rao, Principal Secretary, Department of Agriculture, GoK, emphasized on digital technology in agriculture. “Geospatial technology and satellite imagery, for instance, could be very helpful in drought monitoring, pest/disease surveillance, climate prediction, and more,” he said.

Areas discussed for possible future collaborations included release and distribution of improved crop varieties (especially groundnut); post-harvest processing and marketing knowledge transfer; simple IT-based applications for farmers; and evaluation of the state agricultural institutions.

Dr Sreenath Dixit, Head, ICRISAT Development Center, who has been working closely with the Agriculture Department in Karnataka, mentioned the importance of documentation and accurate impact assessment studies in large projects. “Among other things, one of the biggest contributions of ICRISAT has been agricultural productivity enhancement. We need to now move forward with better strategies for continued assistance to Karnataka farmers,” he said.

Following this visit, new proposals would be considered to strengthen and reinforce the partnership.
Reforms on agri-marketing, contract farming, and land leasing apart from an aggressive export policy are what driving agri-growth requires.

In the general Budget this year, the Centre had announced that Minimum Support Prices (MSP) will be fixed to give a profit margin of 50% over the “cost of production” in major kharif crops. With the onset of the southwest monsoon and the sowing of kharif crops having already begun, the Cabinet approval for hiking the MSP for 14 kharif crops could not have been delayed further. In line with the Budget announcement, the increase in the support prices is a welcome move. With the forecast of a good monsoon this year, this could substantially help in raising the incomes of farmers across the country.

As per the Cabinet decision, the MSP for common grade paddy has been raised by Rs 200 from the existing Rs 1,550 a quintal, which is a 13% hike over that of last year. Similarly, the hike in the case of coarse cereals (consisting of millets, now referred to as nutri-cereals after the April 2018 notification of the Government of India) as well as for cotton has been very significant. In case of finger millet (ragi), jowar (sorghum) and bajra (pearl millet), the increase in MSP is 52.5%, 42% and 37% over last year’s prices of Rs 1,900, Rs 1,725 and Rs 1,425, respectively. With the Centre aiming for the ‘nutritional security’ of citizens, this is indeed a very significant step, more so given it comes in 2018 that has already been declared as the national year of millets.

With increasing preference for nutritious food crops from consumers, mostly from urban areas, cultivation of climate-resilient nutri-cereal crops may get a push in the coming years. Among the pulses, moong has seen a quantum jump in its MSP, increasing by Rs1,400 from last year’s price of Rs 5,575 per quintal. The increase in tur (arhar or pigeon pea) and urad MSP has been of Rs 225 and Rs 200, respectively.

The new MSP for medium- and long-staple cotton has been raised by Rs 1,130 (for both) from the existing Rs 4,020 and Rs 4,320 per quintal.

Who are those people we call farmers?

Agricultural interventions should match household aspirations

Just about six percent of rural households in Kenya, aspire for their children to become farmers. This is highlighted through a recent study that interviewed 624 rural households from Embu and Kitui in eastern Kenya.

The study found however, that 65% households hoped to increase their farm incomes. Closely linked to a recently published theoretical paper on the importance of aspirations, this publication focuses on household aspirations to understand its link to the potential for technology adoption.

Rural households are diverse and it is essential to carefully differentiate them. When technologies are developed and released, it is important to recognize that not all rural households’ first priority is to increase farm productivity, but that the lived reality is complex. The choice of technologies depends on a household’s potential to invest and also on its long-term aspirations.

Keeping this diversity in mind, labelling all households engaged in some form of farm activity as ‘farmers’ may create a mismatch between demand and technology development.

Rural household diversity and aspirations

It is in this context, that considering non-farm aspirations of rural communities is very important. These aspirations may influence household perceptions of the relative value of agricultural innovations and also their adoption choices.

While only 6% of the households interviewed, hoped for a future in farming for their children, their contrasting personal aspirations and investment plans mostly involve expansion or intensification of farming. Even wealthier households might not have the long-term aspirations needed for investments in certain practices that provide delayed benefits e.g. soil fertility management.
Media Release

India gets its first biofortified sorghum

(L-R) Smt Sunanda Shinde; Smt Ahilyabai Shinde; Dr Peter Carberry, Director General (Acting), ICRISAT; Sri Madan Rao Shinde; Prof AS Dhawan, Vice Chancellor, VNMKV; and Dr DP Waskar, Director of Research, VNMKV.

Hyderabad, 5 July 2018 — India’s first biofortified sorghum (jowar), with significantly higher iron and zinc than regular sorghum, was formally launched today. Developed by ICRISAT it was released for cultivation by Vasantrao Naik Marathwada Krishi Vidyapeeth (VNMKV), Maharashtra. The improved variety ICSR 14001, released as ‘Parbhani Shakti’ by VNMKV, offers a cost-effective and sustainable solution to address micronutrient deficiency. An MoU was signed today between ICRISAT and VNMKV for large-scale seed production and dissemination. Read more...

Photo feature

Australian farmers learn about demand-driven rural interventions

A group of 17 farmers from Australia visited ICRISAT and a few other sites on 9 July 2018 to better understand the science-led interventions that are changing the face of agriculture in the region. They also visited the Adarsha Watershed project in Kothapally and spent time interacting with the farmers and women’s self-help group members.

The farmers there informed them how increased water availability had helped them achieve higher crop yields and diversify into high value crops like vegetables and flowers.

Benefits of watershed projects displayed via posters in Kothapally.

The visitors are all ears as they learn about low-cost soil and rainwater conservation and groundwater recharge systems.
**Workshops**

**Bolstering NARS partners with systems modeling training**

Dr R Vijayalakshmi of KVK, Virudhunagar, Tamil Nadu, making a point at a recent workshop on systems modeling.

The use of systems modeling tools and decision support systems can be of great advantage to farmers by helping them plan their farming activities based on weather predictions. ICRISAT has been actively involved in building up the capacities of its NARS partners in this area. Workshops, hands-on training sessions, and information exchange programs conducted by ICRISAT’s Innovation Systems for the Drylands (ISD) team increase awareness and use of these technologies among extension agents and subsequently, the farmers.

The ISD team, while developing, validating and piloting ‘whole-farm’ models, also aims to deploy the models in at least three different farming systems in the fragile semi-arid South India. This modeling technology is highly useful in evaluating climate-smart interventions and providing pathways to double farmers’ incomes. For this, extension agencies need to be trained to make efficient use of systems modelling tools and future decision support systems. With such training, they can then build farmers’ resilience to climate-related shocks.

The ISD team will be working with Krishi Vigyan Kendras (KVKs) of the four states of Andhra Pradesh, Maharashtra, Tamil Nadu and Telangana over the next one year to parameterize the farming systems and develop possible scenarios for each of these locations for integrating appropriate interventions.

For more information on ICRISAT’s work in the area of climate-smart agriculture, click here.

**Proposal for improved groundnut seed systems in Karnataka**

The groundnut seed system in Karnataka is set to receive a boost with the Department of Agriculture, Government of Karnataka, looking for an integrated, science-backed solution to encourage the use of improved groundnut seeds in the state. In a recent meeting, Mr M Maheshwar Rao, Principal Secretary, DoA, GoK, expressed interest in partnering with ICRISAT to develop viable, holistic seed systems for groundnut, so that agricultural value chain stakeholders, especially farmers, in the state can benefit. Noting the substantial positive impacts of the rural intervention projects – Sujala, Bhoochetana and Bhoosamruddhi – in increasing incomes and enhancing lives of millions of Karnataka farmers, he hoped that further collaboration with ICRISAT would yield significant impacts in the future too.

Mr Maheshwar Rao, (in blue) Secretary, Department of Agriculture, Government of Karnataka; along with Dr Sreenath Dixit (to his right), Head, ICRISAT Development Center, ICRISAT at the meeting in Bengaluru in June 2018.

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**Project:** Integrating systems modelling tools enabling informed decisions for upscaling climate smart agriculture

**Partners:** Indian Council for Agricultural Research (ICAR), Central Research Institute for Dryland Agriculture (CRIDA), Central Arid Zone Research Institute (CAZRI), Krishi Vigyan Kendras (KVKs)

**Funders:** ICAR, CGIAR Research Program on Grain Legumes and Dryland Cereals (GLDC)

**CGIAR Research Program:** GLDC

This work contributes to UN Sustainable Development Goals

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Announcements

Former ICRISAT Regional Director is now a Senior Fellow

Dr Said N Silim, eminent crop physiologist and agricultural development specialist from Tanzania, has recently been appointed an ICRISAT Fellow. He was deeply involved in the Pigeonpea Improvement Project in ESA, which was instrumental in substantially increasing the area of pigeonpea cultivation, productivity and popularity as a major export crop in Kenya, Malawi, Mozambique and Tanzania. Dr Silim was part of the team that won two CGIAR King Baudouin Awards – in 1998 for pigeonpea improvement, and in 2002 for chickpea development. After leaving ICRISAT in 2013, Dr Silim was the Coordinator, Sub-Saharan Africa (SSA) Regional Program at ICARDA (International Center for Agricultural Research in the Dry Areas).

Dr Silim was with ICRISAT from 1990 to 2013, in various capacities – from Principal Scientist (Cereals and legumes), through Country Representative (Kenya), to Director, Eastern and Southern Africa (ESA).

Former DDG honored

Professor John DH (Dyno) Keatinge MBE, former Deputy Director General-Research (DDG-R), ICRISAT, was awarded an honorary Doctorate of Science (DSc) on 4 July 2018 by the University of Reading, UK. Currently the CEO of Tropical Agricultural Development Advisory Services, United Kingdom, Dr Keatinge has over 45 years of experience in agriculture, agronomy, horticulture and more. After leaving ICRISAT, Dr Keatinge worked at The World Vegetable Center as its Director General. Prior to this, Dr Keatinge had been made an honorary Life Fellow of the International Society of Horticultural Science in 2016 and awarded an MBE (Most Excellent Order of the British Empire) in 2017.

We congratulate Dr Keatinge on this prestigious award and wish him the very best in his future endeavors.

In the media

Saving the seed: A bank that secures the future of agriculture

Stashed away in earthquake proof and environment-controlled vaults in south India, are thousands of stockpiles of seeds of crops important to semi-arid tropics covering Asia, much of southern and eastern Africa, and a few locations in Latin America.

New study explores whether and how institutional perspectives are reflected in the global literature on climate-smart agriculture.

New study observes the rise of seed-producing cooperatives in the region

A new study by the Access to Seeds Index, supported by Agence Française de Développement, the Government of The Netherlands and AgriCord, evaluated over 50 seed-producing cooperatives across 20 countries in West and Central Africa.

Farmers are the nutrition providers of any nation. They are responsible for producing food for the entire nation. Ironically, they are also one of the most malnourished people in India. The farmers are also paid the least in the entire food production and distribution hierarchy.