Dr Nigel Kerby MBE brings a wealth of experience in managing and commercializing science to maximize its impact to serve society. He pioneered the commercialization of scientific intellectual assets as former Managing Director of Mylnefield Research Services (MRS), a commercial affiliate of the James Hutton Institute established in 1989. Dr Kerby’s experience as member of the Board for the National Institute of Agricultural Botany (NIAB), UK; member of the Board of Roslin Technologies Ltd, UK; and Chairman of NIAB EMR, UK; will offer a diverse and business-oriented perspective to ICRISAT’s mandate as we focus on Inclusive Market-Oriented Development to lift dryland farm families out of poverty and address malnutrition and resilience to climate change. Dr Kerby is very passionate about ICRISAT’s mission and has seen firsthand the impact of ICRISAT’s research with dedicated partners in South Asia and sub-Saharan Africa.

ICRISAT and partners warmly welcome Dr Kerby as Chair and look forward to his leadership to ensure that ICRISAT delivers on its critical mission to serve farm families in the dryland tropics, where poverty and malnutrition are most acute and where urgent solutions are required to adapt to rapid changes in weather variability.
Farewell to ICRISAT Governing Board Chair Professor Chandra Madramootoo

Passionate’, ‘dedicated’ and ‘committed’ were just some of the adjectives used to describe outgoing Governing Board Chair Professor Chandra Madramootoo as ICRISAT bid him farewell.

Prof Chandra (as he is popularly called) completes his three-year tenure as Governing Board Chair, ICRISAT, on 30 April 2017. He joined the Board in March 2009, was elected as the Board Chair in April 2014 and has since played a key role in ICRISAT’s dynamic journey.

He oversaw the development of a country strategy for drought-hit Zimbabwe in 2016, the setting up of a pilot biogas plant to extract energy from biomass of constructed wetlands at ICRISAT-India, an effective Farmers Day where farmers pledged to use ICRISAT technology to help double their incomes, and several other milestones.

Prof Chandra completed his Bachelors, Masters and PhD (Agricultural Engineering) from McGill University, Montreal, Canada and was named to the James McGill Professorship in 2000.

Dr David Bergvinson, Director General, ICRISAT, said in his address, “We acknowledge the tremendous contribution of Prof Chandra, who has so ably served ICRISAT in different capacities. He has not just brought his wisdom and wealth of knowledge about irrigation science to ICRISAT, but has left an indelible footprint on the people he touched through mentoring, including myself. His James McGill Professorship has been renewed for 15 years, which is very rare. It points to his character and unique skills including mentoring students and colleagues, and being really passionate about what science can do for society.”

Dr Bergvinson talked about Prof Chandra’s successful research career and about his will to take on the urgency with which innovation needs to be applied to address society’s needs, especially the Sustainable Development Goals. “He has really invested himself in understanding our science and our partners,” said Dr Bergvinson. “That has been a tremendous asset as the board deals with the issues of positioning our research strategically.”

Dr Bergvinson thanked Prof Chandra for steering ICRISAT through challenging times and for going beyond the call of duty as not just a leader of science but as a mentor of people.

Incoming Governing Board Chair, Dr Nigel Kerby, MBE, said, “What I know of Chandra as a person is that he’s truly dedicated, truly committed. He expects the best from others but also gives his very best to the job. I believe that he is leaving ICRISAT in a much better position than it was when he took over, despite the challenging times it has faced.”

Dr Paco Sereme described how he met Professor Madramootoo and said, “When I joined the ICRISAT Board, I saw the way he dealt with issues the Board has to deal with and what impressed me is the way he respects the view the people. That is important for a Board Chair. I have also seen his commitment for sub-Saharan Africa and the entire drylands. It was a pleasure for me to work with Chandra and I know that in him we have a friend to assist us all the time.”

Ms Oluwande Muoyo remarked, “He has inspired me in terms of dedication to ICRISAT and acceptance of the responsibility that we Board members are handed.”

Dr Paul C Anderson commented, “As Board Chair, Chandra has exactly the characteristics needed to manage a diverse group such as that at ICRISAT. He’s extremely well organized, very very polite and a thorough gentleman. He’s very well-spoken and he represents ICRISAT very well because of these characteristics.”

“It’s been said many times by other Board Chairs in Australia about how Chandra makes them feel as though they need to work a little bit harder,” said Dr Wendy Umberger. “He’s really inspired other people in the CG system to do better, to be more dedicated to their centers. He leaves big shoes for all of us Board Members to fill.”

Dr Laurie Tollefson said that he had known Prof Chandra from the time they were young. “He’s always driven me to try to be better. He’s been an inspiration for me, personally as well as academically, in every way. I know his love for ICRISAT, his love for international agriculture. He is a visionary and a true leader and we’re lucky to have him at ICRISAT.”
A walk through time...

2009 - At a pearl millet display.
2009 - Observing different chickpea varieties.

September 2011 - Attending a poster presentation, ICRISAT-India.
September 2011 - Checking out the microscopic details.

April 2012 - At a chickpea field at ICRISAT-India.
April 2014 - Inaugurating the HPCGA* facility, ICRISAT-India.

April 2014 - With Dr Nigel Poole.
September 2014 - At the Kothapalli Watershed, India.
April 2016 - At a village in Zimbabwe.

*High Performance Computational Genome Analysis
April 2016 - Surveying a goat market in Zimbabwe.

April 2016 - At ICRISAT-Bulawayo, Zimbabwe.

In a pensive mood

2009 - His first Board Meeting as a Board member.

April 2014 - His first Board Meeting as Governing Board Chair.

April 2017 - As the outgoing Governing Board Chair.
Modernizing crop breeding programs, enhanced monitoring and evaluation, digital agriculture and strategic research support to Africa locations were a few of the key topics discussed at the recent biannual Governing Board Meeting.

In a review of the first phase (2012-2016) of the two CGIAR Research Programs (CRPs) led by ICRISAT – Dryland Cereals and Grain Legumes – it was recalled that over 256 new legume varieties and 119 new dryland cereal varieties were developed and released in sub-Saharan Africa and India. For the next phase of the CRP, based on the audit reviews of Phase I, the Board recommended that ICRISAT management invest time, talent and resources to develop a lucid and compelling Phase II CRP proposal.

Professor Chandra Madramootoo, Governing Board Chair, commended the fruitful partnership between ICAR and ICRISAT with both institutions having similar goals and complementing each other’s strengths well. He hoped for a long and productive association with ICAR in the future.

Dr Nigel Kerby underscored the cooperation between stellar institutions such as ICRISAT and ICAR. He said that ICAR’s Farm Science Centers were inspirational and would help attract youth to agriculture.

Dr David Bergvinson, Director General, ICRISAT, discussed the focus areas for ICRISAT:

- **Modernizing breeding programs**: To reflect its commitment to superlative breeding programs, ICRISAT aims to implement the Breeding Management Systems (BMS) by June 2017, thus becoming the first CGIAR center to do so. A Breeding Program Assessment team had reviewed ICRISAT’s breeding programs and came up with recommendations for improving the programs substantially in terms of targeting, speed, scale, efficiency and quality. Recommendations included enhancement of ICRISAT’s data science; stronger collaboration among data teams, breeders and other disciplines to prioritize statistics, bio-informatics and data management capabilities; and adoption of modern experimental designs and analysis methodologies by breeding teams.

- **Digital agriculture**: By progressively building capabilities in remote sensing, data management, and information and communication technologies, ICRISAT aims to achieve leadership in digital agriculture to help farmers increase productivity and prosperity. The Sowing App created in partnership with Microsoft India (R&D) Pvt Ltd and aWhere (Colorado, USA) is a case in point; groundnut farmers who followed the advisories increased their yield by about 30% compared to those who did not take the recommendations of the app. Dr Bergvinson also highlighted the relevance of the newly commissioned iHub as a focal point for innovation for integration of agriculture science, IT, finance and Governing Board members with Management Group.

Doreen Margaret Mashler Award
Dr Rajeev K Varshney, Research Program Director, Genetic Gains, was presented with the 2016 Doreen Margaret Mashler Award for his significant contribution in the areas of genome sequencing, genetic mapping and functional genomics. His work has played a key role in increasing the visibility and attention to the ‘orphan legume crops’, which are vital to fight the climate change challenge. Some of the noteworthy outputs by Dr Varshney and his team have been: genome sequences of several crops and molecular breeding products such as introgression lines for drought tolerance, pyramided disease resistant lines in chickpea, and rust-resistant and high-oil quality introgression lines in groundnut. ICRISAT is the only CGIAR center to lead genome sequencing of several crops and publish several lead papers in the journal Nature.
energy to accelerate rural growth and reduce risks associated with smallholder agriculture.

- **Enhanced Monitoring and Evaluation (M&E):** Strengthening M&E capabilities helps to track implementation, outputs and success for better alignment with ICRISAT’s institutional goals. It also helps create more effective programs in the future for optimum resource utilization.

- **Strengthening organizational culture:** Centering its policies on the concept of ‘Working as One’, some of ICRISAT’s efforts for improving staff engagement are: providing incentives for stronger cross-team collaboration, offering clear career paths, and carrying out transparent evaluations and periodic employee surveys. Biannual staff survey results would be used to inform further human resource policies.

- **Aligning with country strategies:** ICRISAT’s scientific research, collaborations and resource mobilization activities can be made sharper and more efficient by working with partners for realizing national goals for agri-food systems and rural development for the drylands of Asia and sub-Saharan Africa.

- **Sub-Saharan African countries:** ICRISAT will continue to invest strategically to support its research in sub-Saharan Africa. This is an urgent agenda given the higher vulnerability of dryland farmers and consumers impacted by increased weather variability due to climate change.

The Board inaugurated a pilot processing facility established at the Agribusiness Innovation Platform; this facility can process sorghum, millets, groundnuts and pulses into Energy and Nutrient Dense Foods (ENDFs). As the members saw demonstrations of processing equipment, they learned how it would be used in prototyping and pilot-scale production of ENDFs using ICRISAT mandate crops, supporting entrepreneurship development and capacity building of agribusiness entrepreneurs in India and Africa. The ultimate aim of the pilot facility is to provide farmers with access to similar production facilities for enhancing their income and linking them to the markets.

The Board thanked the outgoing Chair, Prof Madramootoo, for his immense contribution to ICRISAT as he completed his three-year tenure as Chair of the Governing Board and a total eight-year term on the Board. Prof Madramootoo joined the Board in April 2009 and took over as the Governing Board Chair in April 2014. He has since played a key role in ICRISAT’s journey to serve the resource-poor smallholder farmers of Asia and sub-Saharan Africa. The Board also gave a warm farewell to Dr Shoba Sivasankar, Director, CGIAR Research Programs Dryland Cereals and Grain Legumes.

The Governing Board Meeting was held on 19-21 April at ICRISAT-India.
Organizations such as ICRISAT should be prepared for constant and continual changes not only on the climate front but also in politics, geography and economy,” said Mr Elwyn Grainger-Jones, Executive Director, CGIAR System Management Office.

Mr Grainger-Jones and Ms Karmen Bennett, Head of Board and Council Relations at CGIAR, were on their maiden trip to ICRISAT-India. They toured the campus and later Mr Grainger-Jones addressed the senior members of ICRISAT. Beginning the day with a visit to the wastewater treatment units at ICRISAT, Mr Grainger-Jones and Ms Bennett were informed that ICRISAT’s decentralized wastewater treatment plant had been identified by the Indian government for scaling up in rural areas. Many such plants in rural areas are managed by women and provide them with an income. Ms. Bennett was very impressed by the direct and indirect benefits of women earning a livelihood from these projects. (Watch her talk about her impressions here).

Next, they visited the Platform for Translational Research on Transgenic Crops (PTTC) where upstream research of ICRISAT’s mandate crops is being carried out so that meaningful information can be extracted from huge genomic data available to the scientists today. The focus of PTTC is to make use of genome sequence data to precisely engineer crops by deciphering the underlying molecular mechanisms for desirable trait expression. Dr David Bergvinson, Director General, ICRISAT, explained, “Our challenge in the science of delivery is to progress each of the technologies into appropriate crops, pass them on to seed producers for scaling up, and thus reduce the time for delivery.”

They then visited the Agribusiness Innovation Platform (AIP) unit, expressing interest in the various aspects of the AIP, such as providing infrastructure support to small and medium enterprises related to agricultural products, engaging with farmers in remote areas and linking them to markets.

The visitors were also briefed about the structure and operations of the Hybrid Parents Research Consortium for sorghum and pearl millet.

Expressing enthusiasm for the research work being carried out at ICRISAT, Mr Grainger-Jones hoped that the current scenario of global flux would give rise to beneficial partnerships and exceptional leadership at various levels. He said that the hard work, receptiveness to change and the quality of research at ICRISAT were exceptional. He promised to strive to create incentives for innovation and focus on achieving not just scientific but also economic breakthroughs.

After visiting the ICRISAT Headquarter in Hyderabad, Mr Grainger-Jones and Ms. Bennett proceeded to New Delhi. They attended a meeting chaired by Dr Trilochan Mohapatra, Director General, Indian Council of Agricultural Research (ICAR), and Secretary to the Government of India in the Department of Agricultural Research and Education (DARE). Dr AK Padhee, Director, Country Relations, ICRISAT; Mr Chhabilendra Roul (Additional Secretary of DARE and Secretary of ICAR); and several senior officials of DARE/ICAR (International Cooperation Division) also attended the meeting held at the Ministry of Agriculture. Next, they visited Vigyan Bhavan, the venue of the ongoing Kharif Conference, and met with Dr SK Pattanayak, Secretary, Department of Agriculture, Cooperation and Farmers’ Welfare. They also had other meetings with Prof Ramesh Chand, Member, NITI Aayog, and with the Delhi-based Heads of other CGIAR centers.

Mr Grainger-Jones and Ms Bennett visited ICRISAT-Hyderabad on 25 April and New Delhi on 26 April.

Watch Mr. Grainger-Jones speak about his impressions of ICRISAT here. ■
Call for Sustainable Intensification of Farming Systems in Zimbabwe

Researchers and stakeholders recently came together at a workshop to define the role of agricultural research for sustainable climate-resilient food systems and integrated crop-livestock farming in semi-arid Zimbabwe. Discussions were also held on outlining the priorities of government, NARS and ICRISAT in (i) Farming systems: crop, livestock, irrigation and watershed management; (ii) Scenario development: climate change impacts and vulnerability assessments; and (iii) Impact assessments of climate change adaptation and mitigation strategies, pathways and foresight. Apart from discussing the results and progress of ongoing projects, participants also deliberated on aligning research priorities with Zimbabwe’s National Development Plans and the United Nations’ Sustainable Development Goals.

At the workshop, research outcomes of current projects were presented and feedback solicited from key stakeholders about the relevance of the research outputs and their use in future upscaling. Strengthening institutional coordination and development was identified as a major driver of development and area of future research. Another significant insight was that the development of the agricultural sector entails creating the right environment for marketing climate-smart crops and livestock.

Results from the following three projects were presented:
- Integrating crops and livestock for improved food security and livelihoods in rural Zimbabwe (ZimCLIFS, 2012-2017)
- Increasing irrigation water productivity in Mozambique, Tanzania and Zimbabwe through on-farm monitoring, adaptive management and agricultural innovation platforms (2013-2017)
- Agricultural Model Intercomparison and Improvement Project, Crop Livestock Intensification Project (AgMIP CLIP, 2012-2017)

The workshop provided an important opportunity for stakeholders to contribute to the dialog on sustainable intensification and climate change adaptation in smallholder crop-livestock systems. The deliberations can guide ongoing research and policy development at provincial and national level on enabling conditions for those processes.

On the first day of the workshop, plenary presentations about the three research projects were made.

Highlights of the presentations:
- Crop-livestock integration and irrigation systems technologies are ways to enhance farm productivity and resource use efficiency.
- Research, policy and extension must work together to create conditions under which farming will be more profitable.
- Commercialization of the smallholder farming sector must be supported so that farmers can benefit from more efficient value chains.
- Future climate change impacts on farming must be better understood to facilitate suitable development processes, technologies and markets.
- Clear communication among national, provincial and local levels should lead to research-backed consultative decision making and policy processes.

Structured group discussions were held around:
1. How relevant is the information for decision making in your organization? What information is missing? How would you use it?
2. What should research/development/policy priorities focus on, since we know the results?
3. How and through what type of partnerships can we use this research for scaling up?

Feedback from researchers:
- While the information is relevant, it must be continuously validated, updated and packaged. Various ministries should collaborate synergistically for scaling
up climate change adaptations. A forum on research-informed climate change adaptations and impacts needs to be established.

- The assessments need to capture social indicators, be gender-specific, and include analyses on biodiversity, ecosystem services, and indigenous knowledge blended with research.

Feedback from extension officials:
- Research-based information, interventions and initiatives are relevant, but need to be presented to farmers in ways that are easy to understand and implement.
- Models should capture the circumstances of farmers on the ground and include familiar crops and livestock in the smallholder sector. Better coordination and integration of research can help extension services craft meaningful messages and advisories for farmers.
- Information regarding changes in incidences of pests/diseases for crops/livestock as a result of climate change needs to be factored in the models, e.g., the recent fall armyworm infestation.
- More stakeholder consultations across scales, better integration of disciplines and enablement of extension services are factors essential for appropriate climate change adaptation and enabling mechanisms. Institutions should work together for climate change adaptation to be effective.

Feedback from policy makers:
- Research is important at multiple scales. At the farm scale, providing markets to farmers for crops and livestock makes it easier for them to integrate and intensify their farming systems. At a national level, for commercializing the farming sector, there is need for institutional development and a framework for policy integration.

Research can influence programs in multiple ways:
- Suggest new directives in agriculture, e.g. supporting groundnuts as cash crop that is also more climate resilient
- Support targeting and adjustments by agro-ecological zones
- Recommend gender programming, e.g. labor-saving technologies through monitoring irrigation; synergies in crop-livestock systems; and climate-smart commodities, such as goats and groundnuts, that work for women farmers.

On the second day of the workshop, participants visited the Silalatshane Irrigation Scheme to learn about irrigation technologies, scheme management and innovation platforms. While they heard about the challenges faced by farmers, they also learned about tools that they used to know exactly when to irrigate, ultimately increasing water and soil productivity.

The final day was dedicated to devising a strategy for creation of a collaborative group to develop a proposal for the Green Climate Fund (GCF). The discussion of this session focused on designing and packaging research components, partnerships and action items for the proposal. A concept note will be developed a first step towards developing a proposal.

The three-day workshop was held at ICRISAT-Zimbabwe from 27-29 March. Participants (23, including 4 women) included national and provincial policy makers, researchers, extension officials, representatives from international research organizations and an NGO representative.

Project: Agricultural Model Intercomparison and Improvement Project, Crop Livestock Intensification Project (AgMIP CLIP)
Partners: World Agroforestry Centre (ICRAF); Climate System Analysis Group, University of Cape Town; Plant Production Systems group, Wageningen University; Matopos Research Institute; National University of Science and Technology, Bulawayo; Institute for Development Studies, University of Zimbabwe; Agricultural Research Institute of Mozambique (IIAM); Lilongwe University of Agriculture and Natural Resources (LUANAR)
Funder: United Kingdom Department for International Development (UKaid)

Project: Increasing irrigation water productivity in Mozambique, Tanzania and Zimbabwe through on-farm monitoring, adaptive management and agricultural innovation platforms
Partners: Australian National University; University of South Australia; Commonwealth Scientific and Industrial Research Organisation (CSIRO); University of Pretoria; Ardihi University; National Institute of Irrigation in Mozambique
Funder: Australian Centre for International Agricultural Research (ACIAR)

Project: Integrating crops and livestock for improved food security and livelihoods in rural Zimbabwe (ZimCLIFS)
Partners: International Livestock Research Institute; CSIRO; International Maize and Wheat Improvement Center (CIMMYT); Queensland Alliance for Agriculture and Food Innovation (QAAFI); Matopos Research Institute; The University of Queensland, Australia; NARS, Zimbabwe
Funder: ACIAR

This work contributes to UN Sustainable Development Goals
Growing interest for sorghum in Mali

A team of 15 newly recruited agricultural technicians were given an overview of sorghum breeding during a tour of ICRISAT-Mali. This included information about activities such as seed production, and development of hybrid parents, commercial hybrids and biotic and abiotic stress-resistant populations. The technicians were part of an NGO, MyAgro, which trains technicians in dissemination of different crop technologies in Mali.

Drought-tolerant sorghum, which is used as food, fodder and a cash crop in West Africa, is faring better in the drought-prone regions of Mali compared to maize, encouraging more farmers to take up cultivation of sorghum in the region. ICRISAT and its partners have registered 13 Open Pollinated Varieties (OPVs) and 7 hybrids in the national/regional catalog in Mali in 2016 under the hybrid sorghum program to boost sorghum yield and productivity.

“Our objective is to develop varieties of sorghum adapted to the local conditions with farmers’ preferences,” said Dr Aboubacar Toure, Senior Scientist, Sorghum Breeding, ICRISAT-West and Central Africa. “I am happy to see that more young people will be specialized, starting from this year, in sorghum dissemination. I hope they will keep up this passion that we share.”

The group showed keen interest in the development and distribution of high-yielding sorghum varieties that are adapted to climate change. They had numerous questions related to breeding traits and characteristics for resistance to drought, hybrids parents’ production, etc.

Dr Toure informed the trainees about ICRISAT’s regional research program, while Dr Baloua Nebie, Scientist, Sorghum Breeding, explained the activities of the Sorghum Breeding team, especially those in the off-season. “Some varieties and hybrid sorghum have grain yields of over 2 tons per hectare in farmer’s conditions, which is important,” emphasized Dr Nebie. “A continued training of seed producers in seed production techniques will ensure high quality hybrid seed and strengthen the seed dissemination system.”

Mr Ibrahim Sissoko, Senior Scientific Officer, provided answers to questions related to constraints such as striga, anthracnose, midge and stem borer that commonly affect sorghum production.

To meet the needs of the farmers in its target zones of Mali, MyAgro has tested one sorghum hybrid, ‘Pablo’, and one variety, ‘Tieble’, with 100 producers during the cropping season 2015-2016. MyAgro, in its fifth year of collaboration with farmers’ cooperatives, intends to expand its network of young technicians for dissemination of technologies of different crops in the coming years.

The visit to the ICRISAT-Mali campus took place on 11 April.

For more on ICRISAT’s work in Mali

This work contributes to UN Sustainable Development Goals

Photo: A. Diama, ICRISAT
Ethiopian chickpea scientists participated in a workshop to take stock, collate and convert large amounts of research data, generated during the Tropical Legumes I, II and III projects over the decade 2007–2017, into usable information. Once compiled, this information can be communicated to the target audience – farmers, policy makers, other researchers and stakeholders along commodity value chains. This ensures that challenges facing the commodity for which research solutions are available are tackled on time and disastrous losses are averted.

Participants at the meet included 17 experienced chickpea researchers from national and regional programs and universities covering germplasm enhancement, breeding, agronomy, crop protection, seed systems and socioeconomics. At the end of the workshop, 20 manuscripts were drafted with the target of publishing them in a special journal issue. Over the next few months, these manuscripts will be further enhanced and enriched.

The writeshop was organized by the Tropical Legumes III (TL III) project during 6-13 April at ICRISAT-Ethiopia.

More on the Tropical Legumes project

**Project:** Tropical Legumes I, II and III  
**Funder:** Bill & Melinda Gates Foundation  
**Partners:** International Center for Tropical Agriculture (CIAT), International Institute of Tropical Agriculture (IITA), national agricultural research system (NARS) in focus countries and ICRISAT  
**CGIAR Research Program:** Grain Legumes

This work contributes to UN Sustainable Development Goals

- No Poverty
- Zero Hunger
- Good Health and Well-being
- Partnerships for the Goals
Opportunities for youth in agriculture value chains

Around 200,000 young men and women will be trained in seed production of sorghum, cassava and rice. The training will enable them not only to produce high quality seeds but also to serve as out-growers for seed companies.

The National Youth Training on Seed Production and Processing Technology is part of the Agricultural Transformation Agenda Support Program - Phase 1 (ATASP-1), supported by the Federal Government of Nigeria through African Development Bank. ATASP-1 aims to provide additional incomes to agricultural producers and entrepreneurs by creating about 120,000 jobs along value chains of its mandate crops. Another goal is to add 20 million tons of key commodity food crops to the country’s domestic food supply per annum. In this intervention, one of the major challenges facing farmers is the shortage of quality seeds, especially of open pollinated varieties.

Flagging off the training program, Nigeria’s Minister of Agriculture and Rural Development, Mr Audu Ogbeh, stated that the training was strategic, as the availability of quality seeds at the right time was crucial to enhance productivity of Nigerian farmers. He announced, “The federal government will soon remove the duties on import of steel to encourage more local fabrication.”

At the inaugural event, various research organizations demonstrated the different activities of production, processing, value addition, nutrition and mechanization that they were involved in. Dr Hakeem Ajeigbe, Country Representative, ICRISAT-Nigeria showcased locally fabricated small-scale machineries for use by youth and women for agriculture, income generation and increased productivity of farm-related enterprises.

The training will be conducted concurrently at ICRISAT-Nigeria (sorghum), the International Institute of Tropical Agriculture, Kubwa (cassava) and the National Cereals Research Institute, Baddegi (rice).

The event, held on 27 March in Abuja, Nigeria, was attended by several stakeholders including Mr Ibrahim Amadou, Task Team Manager, African Development Bank; Engr Haruna Akwashiki, National Program Coordinator, ATASP-1; directors from the Federal Ministry of Agriculture and Rural Development (FMARD); Dr Gbassey Tarawali, ATASP-1 Outreach Coordinator and Abuja Station Manager who also represented the IITA Director General; and Dr Philip Idinoba, Rice Commodity Specialist, Africa Rice.

More on ICRISAT’s work on seed systems
More on ICRISAT’s work in Nigeria.

Project: Agricultural Transformation Agenda Support Program -1 (ATASP-1)
Partners: See web version for the full list of partners
Funder: African Development Bank (AfDB), State and Federal Government of Nigeria

This work contributes to UN Sustainable Development Goals
Biofortified crops to combat malnutrition in Nigeria

Biofortified sorghum and pearl millet were the focus of a recent exhibition at Abuja, Nigeria. Two sorghum varieties – improved Deko and improved Zabuwa – which are rich in iron and zinc, and several micronutrient-rich pearl millet varieties have been developed and distributed in Nigeria in the past year to combat malnutrition in the country. ICRISAT also demonstrated food products processed from biofortified sorghum, millet and groundnut.

The exhibition was aimed at informing the general public, key stakeholders and policy makers about the potential of biofortified staple foods. Other crops displayed were groundnut, cassava and sweet potato.

Senator Heineken Lokpobiri, the Honorable Minister of State for Agriculture and Rural Development, Nigeria, said, “Malnutrition of trace elements faced by Nigerian children based in the rural communities is going to be a thing of history in few years to come because breeders now breed for crops that are naturally enriched with micronutrients, therefore saving us from consuming chemicals as supplements to the nutrients required for our survival.” He added, “The Ministry is ever ready and willing to collaborate with any institution that is interested in the fight against malnutrition and hunger.”

The exhibition was held at the Federal Ministry of Agriculture and Rural Development (FMARD) headquarters, Abuja on 31 March. Organized by the International Potato Center (CIP), the program was chaired by the Honorable Minister of State for Agriculture and Rural Development, Senator Heineken Lokpobiri; Dr Olapeju O Phorbee, Country Manager, CIP-Nigeria, as well as directors and senior staff of FMARD.

Mr Aliyu Adinoyi, Scientific Officer, explaining about displayed crops and products to Senator Lokpobiri.

More on ICRISAT’s work on nutrition.

Project: Agricultural Transformation Agenda Support Program-Phase 1 (ATASP-1)
Partners: The Federal Ministry of Agriculture and Rural Development (FMARD), Institute of Agricultural Research (IAR), International Institute of Tropical Agriculture (IITA), AfricaRice
Funder: Government of Nigeria through African Development Bank (AfDB)

This work contributes to UN Sustainable Development Goals

More on ICRISAT's work in nutrition.
Researchers from the University of Leeds, United Kingdom, and ICRISAT-India pledged to pool resources and share knowledge in order to achieve accelerated results that will benefit smallholder farmers across the world.

At a two-day mini-symposium, talks and discussions focused on this cooperation ranging across different themes of ICRISAT’s research programs.

The key areas discussed were:

1. To explore, develop and work on collaborative research projects for transforming research results into higher genetic gains in the farmers’ field, and to help the global farming community at scale. This includes but is not limited to:
   - Transformation of legumes for genes controlling vacuole structure in pigeonpea;
   - Development of protoplasts for legumes and discovery of a good protocol for transgene expression of legumes protoplast for gene knockouts;
   - Utilization of ICRISAT’s mini core population for phosphate responses and linking to the field testing system;
   - Characterization of symbionts using ICRISAT’s high throughput phenotyping facility and understanding symbiosis in legumes;
   - Work on CO₂ and symbiosis; take it from the lab to the field;
   - Study of physiological models: how changing environment effects physiological trait characterization;
   - Work on signaling between symbionts, plant and host, and its controlling mechanism; also the possibility of its manipulation for crop improvement;
   - Study of root nodulation in peanut; how it is different from the same in other legumes in terms of enzymatic, structural, genome-level, expression-level (transcriptome) and protein variations. Study of root angle development and Arabidopsis in sorghum; and
   - Understanding the biology of the geotropism and skotomorphogenesis in groundnut crop; how this understanding can help improve yield.

2. To jointly work on high-quality publications from collaborative research that would benefit the global scientific community.

3. To support exchange visits of scientists, research scholars and students for knowledge sharing between ICRISAT and the University of Leeds.

Dr Alison Baker, Professor at School of Molecular and Cellular Biology, who led the delegation from University of Leeds, said, “I am glad to note that the expertise at ICRISAT is highly complementary and it would definitely be helpful for University of Leeds to work together with ICRISAT for the benefit of science and farmers.”

Dr Rajeev Varshney, Research Program Director, Genetic Gains, said that this collaboration would strengthen the research activities at both institutions. It would help accelerate the rate of transformation of research results for the benefit of smallholder farmers and for the global scientific community in generation and sharing of knowledge resources.

The mini-symposium was hosted by ICRISAT-India on 5-6 April and was attended by 35 participants including 5 delegates from the University of Leeds and 2 observers from the British Deputy High Commission, Hyderabad.
Replacing maize with drought-tolerant crops such as sorghum, millets, pigeonpea, cowpea and green gram is helping farmers overcome the failure of rains and its damaging impact on maize in Busia county in western Kenya.

Lately maize had taken over traditional crops like sorghum and millets in Busia county. With the failure of rains in the March-July and August-December rainy seasons in 2016, farmers who planted maize have been most affected.

To promote drought-tolerant crops like millets and sorghum, farmers have been trained on good agricultural practices, post-harvest handling and value addition, and have been provided with quality seed of improved varieties. Capacity building of farmers and agricultural extension workers to promote production and utilization of sorghum, finger millet and groundnuts has resulted in 62.7 tons of quality seed of the three crops being accessed by farmers in three counties in western Kenya during the 2016/17 short rainy season.

This was possible due to a collaboration between the Busia county government, the Kenya Agricultural and Livestock Research Organization (KALRO) and ICRISAT. This work has been going on over the past three seasons in eight counties in Kenya.

On 20 January, representatives from the Busia county government, KALRO, ICRISAT, media and farmers visited sorghum seed production farms and several farmers to appreciate the capacity of drought-tolerant crops to mitigate the effects of drought and ensure food and nutritional security. The foundation seed production is done in collaboration with the Farmer’s Training Centre of the county government and trained community farmer seed producers. The sorghum and millet farmers visited had enough grain to last them until next harvest (July 2017) whereas 8 in 10 farmers who planted maize had total crop failure.

Dr Moses Osia Mwanje, County Executive for Agriculture (Minister for Agriculture), reiterated the importance of crop diversification and improved post-harvest handling as key to ensure not only food and nutritional security but also to generate cash income from sale of surplus produce. The Minister reiterated his full support to the initiative.

Speaking at the event, Dr Moses Siambi, ICRISAT Regional Director, Eastern and Southern Africa, and Dr Eric Manyasa, Scientist, Cereals Breeding, ICRISAT, promised to continue the good collaboration to out-scale the technologies for drought-tolerant crops to other county wards and noted that the over-reliance on maize complicated food security, more so in years when rains failed. ICRISAT will work with other stakeholders to promote community-level seed production, establish seed banks to ensure sustainable access to affordable seeds by farmers, train farmers in value addition and product diversification, and also link farmers to markets.

More about ICRISAT’s work in Kenya
More about ICRISAT’s work on sorghum

Project: Accelerated Value Chain Development (AVCD) – Drought-tolerant Crops (DTC) component
Funder: United States Agency for International Development’s (USAID) Feed the Future (FF) program
Partners: Kenya Agricultural and Livestock Research Organization (KALRO), Busia county government and ICRISAT
CGIAR Research Programs: Dryland Cereals and Grain Legumes

This work contributes to UN Sustainable Development Goals
New variety of chickpea helps Bangladeshi farmers fight climate change

A new variety of chickpea, which is heat-tolerant, resistant to Botrytis grey mold (BGM) and also high-yielding, was released as BARI Chola-10 in Bangladesh. Based on ICRISAT variety ICCV 92944, this variety is expected to provide some relief to farmers in Bangladesh, which is often cited as one of the countries most vulnerable to the adverse impacts of climate change.

The cropping system in Bangladesh is mainly rice based and chickpea is grown after the rice harvest. About 800,000 ha land of the high Barind tract in northwestern Bangladesh, which remain fallow after rice cultivation, can potentially be brought under chickpea cultivation. However, chickpea sowing is often delayed (up to December) due to late harvest of rice. As a result, the chickpea crop is exposed to heat stress during its reproductive phase. Heat stress, identified as one of the major constraints to chickpea production in Bangladesh, adversely affects pollen viability, pod set and grain yield.

ICRISAT has been working closely with the Bangladesh Agricultural Research Institute (BARI), for developing improved lines of chickpea adapted to local conditions, and has supplied over 9,000 breeding lines to Bangladesh. So far, six varieties of improved chickpea have been released from the breeding materials supplied by ICRISAT. These are Nabin (ICCL 81248), BARI Chola-2 (ICCV 10), BARI Chola-3 (ICCL 83105), BARI Chola-4 (ICCL 85222), BARI Chola-6 (ICCL 83149), BARI Chola-8 (ICCV 88003) and BARI Chola-9 (ICCV 95318).

Chickpea is one of the most important pulse crops in Bangladesh based on consumption. The domestic demand for chickpea exceeds the local supply and the deficit is met through imports. Bangladesh imported 205,000 tons of chickpea worth USD 127 million in 2013. In Bangladesh, chickpea is consumed in various forms after primary processing, i.e., dehulling, splitting, grinding, parching and roasting. Desi chickpea is consumed in different forms—fresh green seed, dried whole seed, roasted and puffed, roasted and split (phutana dhal), splits (dhali) and flour (besan). Splits and flour are the most common forms of consumption (70–75%) followed by whole seed (15–20%). Desi chickpea is more preferred by Bangladeshi consumers than the kabuli type.

There is an increasing focus on chickpea production in Bangladesh for (1) meeting the domestic demand and (2) diversification of rice-based cropping system with legumes, which can help in improving soil fertility and system productivity. It is hoped that the newly released variety BARI Chola-10 would be rapidly adopted by farmers and contribute to expanding chickpea area and production in Bangladesh.

This improved variety, developed at ICRISAT-India and released on 27 March in Bangladesh, was developed as part of the Tropical Legumes II (TL II) project funded by the Bill & Melinda Gates Foundation. Bangladesh is one of the target countries under the TL II project. The chickpea lines supplied by ICRISAT were first evaluated at Pulses Research A Field Day organized at an ICCV 92944 field in Bangladesh.
Center (PRC), Ishurdi, Pabna. The selected lines from the station trial were then evaluated in multi-location trials in Ishurdi, Gazipur, Madaripur, Barishal, Jessore and Rajshahi districts. They were also ranked in farmer participatory varietal selection trials by 680 farmers (571 men + 109 women).

The breeding line ICCV 92944 has been earlier released in India (as JG 14), Myanmar (as Yezin 6) and Kenya (as Chania Desi 2). In India, the cultivation of JG 14 is spreading in many states including Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand and Odisha. JG 14 is currently among the top 10 indented chickpea varieties for breeder seed in India. In Myanmar, Yezin 6 currently covers about 20% of the chickpea area. Thus, the heat-tolerant chickpea varieties are in high demand in areas where the crop is prone to heat stress during the reproductive phase.

Dr Md Jahangir Alam, Scientific Officer (Chickpea Breeding), PRC, Ishurdi, is the lead scientist for release of this variety. Other collaborating scientists include Dr AKM Mahabubul Alam, Md Shahin Iqbal, Md Golam Azam, Dr Md Altaf Hossain, Dr M Mostofa Kamal, Dr Md Omar Ali, Dr Md Ashraf Hossain, Shaikh Mostafa Zaman and Dr Mohammad Hossain.

More about ICRISAT’s work in Bangladesh
More about ICRISAT’s work on chickpea

Project: Tropical Legumes II, Phase 2 (2011-12 to 2014-15)
Funder: Bill & Melinda Gates Foundation
Partners: Bangladesh Agricultural Research Institute (BARI), Bangladesh Agricultural Development Corporation (BADC), Department of Agriculture Extension (DAE), Bangladesh and ICRISAT
CGIAR Research Program: Grain Legumes

This work contributes to UN Sustainable Development Goals
A partnership to facilitate a sustainable groundnut seed delivery system in Tanzania was established between the Tropical Legumes III (TL III) project of ICRISAT and a local seed organization, Agricultural Seed Agency (ASA). This was facilitated by the Naliendele Agricultural Research Institute (NARI), Tanzania.

At a planning meeting, members of NARI, ASA and ICRISAT discussed the types of groundnut varieties to be produced and the means to make foundation seeds of improved varieties easily available across the country.

ASA is a public seed enterprise that carries out production and promotion of ‘orphan crops seed’, including legume crops, that are not of interest to other seed companies. One of its core aims is to make foundation seed of these crops available nationwide. This is critical in a developing country like Tanzania, where early generation seeds, especially of self-pollinated legume crops, are difficult for farmers to access. Seed companies avoid investing in these crops because of poor rate of seed replacement by farmers.

Currently, basic seeds are being produced on 45 ha at ASA’s Mbozi Seed Farm to feed the groundnut seed production systems and the entire groundnut value chain in Tanzania. Two stress-tolerant varieties that are in good demand in the market, red and tan-colored Mnanje 2009 (ICGV-SM 83708 (ICGMS 42)) and Nachigwea 2009 (ICGV-SM 01711), have been prioritized for production. Across the country, the other stakeholders are being mobilized for a better coverage of the groundnut production regions in the country. This includes more than four seed companies, over 200 seed farmer groups and dozens of agro dealers.

NARI is responsible for co-facilitating the implementation of TL III in Tanzania along with ICRISAT.

More about ICRISAT’s work in Tanzania
More about ICRISAT’s work on groundnut

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**Project:** Tropical Legumes III  
**Funder:** Bill & Melinda Gates Foundation  
**Partners:** Naliendele Agricultural Research Institute (NARI), Agricultural Seed Agency (ASA) and ICRISAT  
**CGIAR Research Program:** Grain Legumes

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This work contributes to UN Sustainable Development Goals
New blog posts

**Agri-buzz**

**IP at ICRISAT: In tune with an evolving innovation landscape**

ICRISAT works towards reducing poverty, hunger, malnutrition and environmental degradation in the dryland tropics and is bound by the CGIAR Principles on the Management of Intellectual Assets.

**Simulating postrainy sorghum yield response to on-station N management in India**

How effective is on-station nitrogen management when applied to the field for postrainy sorghum yields?

**Combating aflatoxin for a healthy world**

Millions of people worldwide are at risk of aflatoxin poisoning due to contamination of groundnut and other legumes by *A. flavus*. On the occasion of World Health Day, we take a look at the dangers of aflatoxin contamination and the best ways to mitigate them in the Agri-buzz blog.
Communicator Awards for ICRISAT

ICRISAT won accolades in four categories at the 22nd Annual Communicator Awards for its work in the communications and marketing areas.

The awards were:
- Award of Distinction: Print (Marketing/Promotion – Calendar) for the ICRISAT International Year of Pulses calendar and booklet with stereograms and a range of facts, figures and stories.
- Award of Distinction: Online Video – Science for the Take 2/Highlights of Science Seminars video featuring key messages of presenters and promoting the longer seminar.
- Award of Distinction: Print (Brochure – Business to Business) for the ICRISAT CSR Brochure: Big Ideas for CSR partnership in sustainable development.

The Communicator Awards is a leading international awards program recognizing big ideas in marketing and communications. Founded over two decades ago, The Communicator Awards is one of the largest awards of its kind in the world. It is sanctioned and judged by the Academy of Interactive & Visual Arts, an invitation-only group consisting of top-tier professionals from acclaimed media, communications, advertising, creative and marketing firms.

My wish for the drylands

On the occasion of our 45th anniversary, watch ICRISAT’s vision for smallholder farmers living in the drylands unfold through these videos.

Mr Elwyn Grainger-Jones, ED, CGIAR, speaks about how ICRISAT combines high-level research with good economics to make agriculture profitable and sustainable for the smallholder farmer.

Dr SP Wani, expresses her views on how ICRISAT’s work directly and indirectly impacts rural women and families.

Ms Karmen Bennett, Head of Board and Council Relations, CGIAR, expresses her views on how ICRISAT’s work directly and indirectly impacts rural women and families.