Ms Cecily Kariuki (center), Principal Secretary, State Department of Agriculture, Kenya, discusses the State’s agricultural priorities with Dr Bergvinson and Dr Siambi.

Harnessing the power of nutri-cereals and young agri-entrepreneurs in Kenya

Diversifying crops and diets to include nutri-cereals like millets and sorghum, attracting youth to farming, unlocking the potential of digital agriculture and creating economic opportunities for smallholder farmers, were some of the key issues that Kenyan government officials, partners, entrepreneurs and academicians discussed with Dr David Bergvinson, Director General, ICRISAT, who visited the country in mid-April.

Forging partnerships with the Kenyan Ministry of Agriculture

Discussing the need to diversify, Ms Cecily Kariuki, Principal Secretary, State Department of Agriculture, Ministry of Agriculture, Livestock and Fisheries, said, “We have to get Kenyan consumers to diversify their diets and we must be able to get interventions that help farm enterprises generate a little more income and also ensure they are more resilient.”

Both Ms Kariuki and Dr Bergvinson agreed that enterprise diversification for high-value nutritional products needs to be strengthened. Dr Bergvinson talked of the need to create economic opportunities for farmers. “We are working with entrepreneurs in Kenya using the Agribusiness and Innovation Platform to build up the next generation of entrepreneurs who can identify processing and marketing opportunities for these commodities,” he said.

Emphasizing the importance of creating awareness about nutrition and diversification of diets, Dr Bergvinson spoke of the ICRISAT approach centered around the value chain framework. It ensures there is
Harnessing the power of nutri-cereals... from page 1

a good understanding of the consumer’s as well as farmer’s requirements and using that to deliver the right solution.

The Ministry and ICRISAT will together plan on how to execute the value chain country strategies being developed. Using a business approach; identifying the right partnerships and working with small and medium enterprises (SMEs) who see a bigger opportunity in this, would be the best way forward. A roundtable discussion with key stakeholders, including the private sector, will be organized as early as possible.

**Strengthening relationships with partners**

**USAID**

Interacting with United States Agency for International Development (USAID) officials, Mr Andrew Read, Agriculture Team Leader, and Mr Harrigan Mukhongo, Business & Organization Development Advisor, Dr Bergvinson informed that ICRISAT will soon be sharing its country strategies with them. “We are looking at the value chain framework which specially targets poor smallholder farmers in the semi-arid tropics, which fit your demographics.”

Some of the key points discussed were:

- Raising awareness on nutritional value of sorghum and millets to create demand
- Value addition in partnership with small and medium enterprises
- Building aggregation facilities
- Looking at technology delivery channels including the private sector, formal and informal sector
- Effective communication to stimulate adoption
- Identify varieties of crops that are suitable for particular processing technologies
- Use of digital technology, including mobiles.

USAID team said that their main focus was on sorghum, millet and groundnuts, and they were looking at strengthening the entire value chain to reach their goal of getting 500,000 households in Kenya out of poverty. They indicated that they are in talks with different CGIAR Centers, ICRISAT being one of them, to bring them all in one group and work on a project (the others are International Livestock Research Institute, International Institute of Tropical Agriculture, International Maize and Wheat Improvement Center and International Potato Center).

**ICRAF**

Dr Bergvinson met the senior management team at the World Agroforestry Center (ICRAF) in Nairobi and discussed possible areas of collaboration such as: green water management, bringing crop components into systems research, using digital technology to support systems integration, testing and promotion of sorghum in semi-arid areas (particularly intercropping with green gram and cowpea), and research on climate smart agriculture.

Dr Bergvinson highlighted ICRISAT’s strength in digital technology to support integration of systems and delivery of knowledge to the farmers. He said, “This is where our partnership can unlock the potential of diversification extending beyond crops to agroforestry.”
Dr Simon Carter, Regional Director, International Development Research Center (IDRC), said their focus was on impacts at scale, partnerships and leadership. Dr Bergvinson spoke of ICRISAT’s country strategies, which he said will be useful in articulating what is needed at the country level and in identifying the right partnerships to work with and help achieve impacts at scale. “We want to be a partner of choice for donors,” he stressed.

Africa in partnership with other partners and now we are discussing the challenges and opportunities that we see here in Kenya,” he said. He informed participants of an interaction he had earlier with the Principal Secretary, Department of Agriculture, who was very happy about the new opportunities around sorghum and millet value addition.

He referred to sorghum and millet as “smart foods” saying that diversification of these crops will help create economic opportunities for smallholder farmers. This requires a host of partners coming together with research organizations such as Kenyan Agriculture & Livestock Research Organization, ICRISAT, and processors.

The processors are members of the agribusiness incubation program of the Sorghum Value Chain Development Consortium (SVDC) and the ICRISAT Agribusiness Innovation Platform (AIP). The team from SVDC and AIP were also present at the meeting.

Exploring areas of collaboration with UoN
In discussions with Prof. Agnes Mwang’ombe, Principal, College of Agriculture and Veterinary Sciences, University of Nairobi (UoN), possible areas of future partnerships identified were:

- Research on farming systems and livestock, using ICRISAT mandate cereals and legumes for livestock fodder and feed.
- Capacity building through co-supervision of masters and doctoral students using ICRISAT’s research skills, research facilities and germplasm.
- Modernizing knowledge dissemination through on-line courses, with UoN acting as a regional catalyst in this process.
- Need for building capacity of researchers to meet future demand as many of the present staff are on the verge of retirement.
- Development of country strategies, involving the private sector and agricultural universities including UoN in Kenya.

**Leveraging digital technology**

To attract youth to agriculture, digital technology is the key. In his meeting with Mr Benjamin Makai, a senior manager at Safaricom Ltd, a leading mobile network operator in Kenya, Dr Bergvinson said, “We want to unlock the potential of digital agriculture to integrate our farmers to equitable markets and create awareness among consumers for better nutrition. Digital agriculture is the vehicle to get the youth into agriculture.”

Mr Makai said the company’s focus areas included financial services (providing credit facilities to smallholder farmers), information dissemination including sharing best practices with farmers (on subscription or on demand), supply chain and access to market. Dr Bergvinson highlighted ICRISAT’s interests and activities around digital agriculture including mobile technology, remote sensing GIS technology and genomics.

The following opportunities for partnership were identified:
- Use the mobile platform to increase awareness among consumers about nutritional value of traditional crops such as sorghum and millets and grain legumes. This will create new market opportunities.
- Create economic opportunities for smallholder farmers and processors through the use of mobile technology to support market integration and equitable market, especially for the commodities that have been displaced.
- Knowledge exchange through digital communication with farmers - exploring opportunities for pre-loading information on a SIM card so that it can reach the farmers quickly.

**Interaction with ICRISAT-Kenya staff**

During Dr Bergvinson’s visit to the ICRISAT genomics lab in Nairobi one of the suggestions made by the DG was to distill rainwater instead of tap water and take advantage of the soft water from nature that would improve most of the lab processes. The lab, hosted and shared jointly with ICRAF, was renovated and expanded in 2014 to accommodate the recently launched African Orphan Crops genomics activities.

The last stop on his visit was the sequencing lab, where the African Orphan Crops Consortium (AOCC) is currently supporting the sequencing of highly nutritious, less researched African crops, jointly with ICRAF. Dr Bergvinson was particularly impressed with the finger millet whole genome sequencing under the AOCC projects and coordination of the activity with counterparts from Bengaluru, India.

At a luncheon meet organized by the staff to celebrate Dr Bergvinson’s 100 days in office, the Director General thanked the team for their support in developing country strategies and meeting with partners. “We need to raise our game on science, and through partnerships achieve impacts,” he urged.
Delivering resilient and productive legume cultivars to smallholder farmers in Africa and India

The Tropical Legumes - III (TL-III) project will develop and deliver at least 50 resilient and productive legume cultivars, with agronomic and market traits preferred by smallholder farmers, in seven countries in sub-Saharan Africa and one location in India. The project anticipates reaching at least 4 million smallholder farmers with seed of targeted varieties over the course of the project. At its conclusion the project will leave behind crop improvement organizations whose capacity to deliver genetic gains will have more than doubled and the seed delivery systems will be capable of sustainably supplying at least 20% of the seed required on a national basis for each crop. Through partnerships with other seed system initiatives supported by host countries, it is anticipated that as much as 40% of the seed required nationally for a targeted crop will be produced sustainably as a consequence of the joint efforts. Further, a cadre of researchers (at least 50% women) who can continue to carry out this work with particular sensitivity to the needs of female smallholder farmers will have been created.

The TL-III project is a major international initiative to develop improved cultivars of common bean, cowpea, chickpea and groundnut and deliver seed at scale to smallholders in eight countries – Burkina Faso, Ghana, Mali, Nigeria, Ethiopia, Tanzania, Uganda and India (Uttar Pradesh state). It builds directly upon the outputs and momentum of Tropical Legumes I and Tropical Legumes II projects.

The program will specifically support the breeding pipelines of the Africa-based breeding programs and chickpea varietal development in Uttar Pradesh. These efforts will result in the release of varieties that exhibit significantly higher yields and yield stability in their target production environments, as well as strong resistances to an array of key pests of each crop. They will have taste, cooking, nutritional qualities and market preference that are equal to or possibly far better than the dominant varieties now grown in target countries.

“TL-III project will develop and deliver at least 50 resilient and productive legume cultivars, with agronomic and market traits preferred by smallholders, that resist the primary biotic and abiotic production constraints of these crops in the target geographies while doubling the genetic gains of the partner breeding programs,” said Dr Rajeev Varshney, Principal Investigator TL-III, Research Program Director – Grain Legumes and Director, Centre of Excellence in Genomics, ICRISAT. “TL-III will employ genomic resources (primarily molecular markers) where this approach is more cost-effective than conventional breeding approaches,” he added. Dr Emmanuel Monyo, TL-II Coordinator, said, “The CGIAR and NARS programs will operate as equal partners in a networked fashion to leverage capabilities and testing resources.”

ICRISAT has been recently awarded Lead Center status to manage and lead the implementation of the TL-III project for the period May 2015 – April 2019. This project is funded by the Bill & Melinda Gates Foundation. The work will be undertaken as part of the CGIAR Research Program on Grain Legumes.
Training on Value Chain Incubator in Africa

At a recently conducted international training program on value chain incubators, participants learned critical skills for successfully managing their enterprises.

The workshop mainly focused on six objectives to:
- expose business managers on value chain incubator management principles
- train participants on operational systems for business incubators
- provide hands-on training to participants on scouting entrepreneurs
- engage participants in client servicing
- improve skills of participants on M&E systems
- train participants on financial management, branding and marketing strategies.

Dr Yemi Akinbamijo, Executive Director, Forum for Agricultural Research in Africa (FARA), during his special address, interacted with the participants and emphasized the importance of agribusiness in Africa and highlighted the role of value chain based incubation.

The main aim of the training session was to expose the attendees to the Timbali Model in a practical hands-on way and to the theme of ‘Incubation Excellence’ as developed at Timbali over a 10-year period.

The Timbali Technology Incubator, in Johannesburg, South Africa, is well known for its franchisee-based incubation model which offers business enabling environment; access to infrastructure, technology, and shared services for its incubates. It is perfectly suited for implementation in the Agribusiness Innovation Incubation Consortia (AIICs) of the Universities, Business & Research in Agricultural Innovation (UniBRAIN). The model has scope for being scaled up and adapted across Africa.

The training program was based on a small-group-workshop-approach, wherein the issues faced at their specific business incubation service environment, were identified by the participants. The delegates then worked out practical solutions based on their experience, approaches and lessons discussed at the incubator. The training also involved six exposure visits to crop production, packaging and business locations as a part of on-site training activity.

The key take-away points listed by the participants from the training program were to set up viable systems; align activities to the needs and the demands of the market; selection of right technology and inputs; enhanced monitoring and evaluation systems for incubators; accurate market analysis, branding, innovations leading to strong and unique value propositions. The participants appreciated the overall training module including the unique farmer-business game.

UniBRAIN is an initiative for advancing agribusiness incubation and improved agribusiness education in Africa. The Agri-Business Incubation (ABI) Program of the Agribusiness and Innovation Platform (AIP) of ICRISAT has been entrusted with the handholding and mentoring activities of UniBRAIN’s 6 pilot AIICs, which work in critical African agricultural value chains.

The training program, attended by 30 participants, was conducted under the supervision of Ms Louise de Klerk, CEO, Timbali, Mr Karuppanchetty, COO, ABI-ICRISAT and Mr Alex Ariho, UniBRAIN Facility Coordinator. The training was organized at the Timbali Technology Incubator, Nelspruit, South Africa.
Groundnut lines producing higher oil yield identified

Four high oil yielding groundnut lines, identified in ‘High Oil’ project, were promoted to Advance Varietal Trials (AVT) based on their superior performance over best checks during two years of evaluation. The mean oil yield of these lines varied from 922 to 978 kg/ha, which is an increase by 10-17% over the best check. Pod yield increase was 16-20% over best check.

This was announced at the recently concluded workshop of All India Coordinated Research Project on Groundnut (AICRP-G). These groundnut lines were evaluated in 26 locations, across five groundnut growing zones of the country.

During 2013, seven high oil yielding varieties were recommended by Junagadh Agricultural University (JAU), Tamil Nadu Agricultural University (TNAU) and Acharya NG Ranga Agricultural University (ANGRAU) for testing under AICRP-G. Four of them, ICGV 05155, ICGV 06420, ICGV 03042 and ICGV 03043 were promoted for Advance Trials in Zone V. Interestingly, of the six test entries promoted in Zone V, four were outputs from this project.

Promotion of four out of seven recommended varieties, a promotion success percent of >50% is a remarkable feat. The accomplishment was possible through concerted efforts of all project partners since 2011.

It began with initial selection of 47 best high oil yielding lines from a collection of 150 advance breeding lines available at ICRISAT’s groundnut breeding unit, followed by planning of multi-location trials, rigorous and efficient screening of test lines at JAU, TNAU, ANGRAU, Directorate of Groundnut Research, and ICRISAT for four seasons from 2011 onwards, systematic execution of the trials, and proper collection of data and subsequent data analysis leading to identification of best performing lines at each location.

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<td>Mean oil yield increase</td>
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<td>10-17%</td>
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<td>Pod yield increase</td>
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On-farm trial of high oil yielding line, ICGV 03042 in Gujarat during 2013-14.

First-ever evaluation trial in India with high oleate groundnut lines

The first-ever evaluation trial in India with high oleate groundnut lines developed under this project is underway during 2014-15. High oleate groundnut has at least two marketable benefits: health benefits to consumer and extended shelf life of groundnut and its products. A total of 27 introgression lines with oil content varying from 53-58%, and oleic acid content varying from 67-83% were identified.

This year’s annual workshop assumes significance for two other initiatives: (a) For the first time, identification of three MABC derived disease resistant groundnut lines, ICGV 13193, 13200 and 13206 for superior pod yield coupled with rust resistance from UAS-Dharwad, Karnataka was reported. ICRISAT shared 20 introgression lines for foliar fungal disease resistance with UAS-Dharwad and TNAU in 2014. (b) A significant move towards ‘demand-driven innovation’ is the constitution of a new trial to evaluate Indian groundnut varieties for their quality attributes and export-worthiness. In recent years, use of groundnut for food and confectionery is increasing in India. Thus, a new trial was constituted to identify varieties that meet domestic and export industry needs. Biochemical properties that contribute to quality of groundnut and its products will be evaluated.

The AICRP-G workshop was held on 12-14 April at Agricultural Research Station, Kadiri, Andhra Pradesh.
Farewell

The following staff members are retiring on 30 April:

**Mr Ganesh Nayak**, Lead Purchase and Stores Officer, Purchase, Supplies and Disposal Services, after serving the institute for over 34 years.

**Mr B Ashok Kumar**, Administrative Officer, RP - Grain Legumes, after serving the institute for over 38 years.

**Mr BN Sudhakar**, Security Associate, Security Services, after serving the Institute for over 21 years.

**Mr Dalip Chand Vanodhia**, Transport Associate, New Delhi Office, after serving the institute for over 30 years.

On their retirement, Team ICRISAT wishes them a very happy retired life.

New Projects

**Project title:** Nudging sustainability transitions using innovation platforms and market-oriented development in Mozambique

**Principal Investigator:** S Homann

**Investor:** Austrian Development Agency

**Aims:** The project integrates social, socioeconomic and agronomic sciences in support of facilitating sustainability transitions. The approach therefore is multi-level, cutting across the local and the systems levels (horizontal and vertical), and is inclusive in nature. This project will develop an Innovation Platform (IP) approach for identifying and facilitating sustainability transitions towards inclusive market-oriented development. Recognizing the complexity of socio-ecological systems and IPs as mechanism for learning and change, the project has developed a nested approach that engages social and agronomic research to better understand and effectively facilitate processes that go beyond incremental changes, but aim at contributing to a reconfiguration of the entire socio-ecological system with better integrated changes leading to substantial impact on rural livelihoods.

**Project title:** Food legumes for enhanced food and nutritional security, systems productivity and profitability of smallholder farmers in Ethiopia and Uganda

**Principal Investigator:** NVPR Ganga Rao

**Investor:** Austrian Development Agency

**Aims:** The main purpose of the project is to increase incomes of smallholder farmers in North Gondar region of Ethiopia and Northern Uganda (Lango and Acholi sub regions) in chickpea and pigeonpea sub-sectors, respectively.

The project plans to study existing market systems to understand the bottlenecks to tailor interventions. Identification of trait-specific sources for marker trait associations for use in crop improvement, genetic enhancement through conventional breeding and use of markers, and need based training (strengthen institutions through innovation platforms (IPs)) of researchers, farmers, extension personnel and private seed industry will be done to accelerate transfer of technologies for speeding up impact to the farming environment.

The project will develop and demonstrate cost effective integrated seed system strategies. Special focus will be put on linking farmers with high value niche markets.