Exploring new products and global markets for sorghum

Specific products and markets were identified to capitalize on the domestic and international demand for sorghum and processed sorghum products. This included product-specific cultivars; products with good demand; and major export markets in Egypt, Saudi Arabia and SAARC countries.

The need for developing product-specific cultivars was highlighted by Dr A Ashok Kumar, Senior Scientist, Sorghum Breeding, ICRISAT. He cited examples of cultivars developed by Mahatma Phule Krishi Vidyapeeth, Rahuri – Phule Panchami for popping, Phule Uttara for papads (wafers) and Phule Madhur for hurda (fried immature grain).

Four products were identified for commercialization in domestic and export markets based on identified market demand: multigrain biscuits and cookies, sorghum flakes, seviyan (vermicelli) and pasta. Multigrain atta (flour) and pop sorghum were also identified as having a good market demand.

Initiatives prioritized for export promotion included the development of standards for various processed products; wet sampling and participation in international exhibitions; development of customized pre-processing machinery; and generating awareness on the nutrition benefits of sorghum.

These key points were discussed at a consultative meeting to fine-tune a strategy and develop a proposal to enhance the export marketability of sorghum and sorghum products from India. This proposal will be submitted to the Agricultural and Processed Food Products Export Development Authority (APEDA), Government of India.

“Global demand for nutritious food products paves the way for sorghum. The Sorghum Export Development Platform is a step in the right direction and we will fully support this endeavor that can benefit both entrepreneurs and farmers,” said Mr Sunil Kumar, General Manager, APEDA.

A draft publication titled ‘Enhancing Exports of Sorghum & Sorghum Products from India: Potential, Policy and Emerging Paradigms’ was released at the meeting.

The meet was held at Pune, India, on 30 July as a follow-up to the first meeting organized on 17 March at ICRISAT. The meet was organized by Indian Institute of Millets Research (IIMR) in association with Department of Agriculture, Government of Maharashtra, and ICRISAT with funding support from APEDA.

An expert panel and over 50 participants from public and private organizations comprising exporters, experts from research and development organizations, government officials and representatives from the sorghum processing industry attended the meeting. For list of participants, see web edition.

For more on sorghum: http://exploreit.icrisat.org/page/sorghum/882
Molecular breeding provides good results for pigeonpea

Various products such as hybrid purity testing kits, markers for disease resistance and enhancing yield and yield-related traits, novel populations for bringing new alleles/combinations in future pigeonpea hybrids/varieties are some of the important outputs of the USAID-funded project ‘Pigeonpea improvement using molecular breeding’.

Information on the 11 products developed during Phase I of the project was shared with stakeholders at a recent workshop, at ICRISAT-India.

Dr Bahiru Duguma, Director, Food Security Office, USAID, mentioned that USAID was keen on this project as it sees it as a climate change adaptation option. “We see this as a good vehicle to transfer outputs to the global level and share them with developing countries. We are looking for quick applicable results,” he said.

The two-day workshop included a day in the field, where project partners interacted with about 40 farmers at the Agricultural Research Station, Gulbarga, India. These farmers have benefited from growing pigeonpea varieties developed by ICRISAT and its partners. They gave positive feedback on the high-yielding, disease-resistant pigeonpea varieties, and shared that they are getting better yields and higher income after adopting the improved varieties. They also shared their concern that sterility mosaic disease (SMD) incidence was on the rise now, and expressed their need for new varieties with enhanced disease resistance.

A progressive farmer, Mr Devendraappa Bedjirgi is growing six pigeonpea varieties and also hybrids on 1.5 ha land. He said, “Until 2011, I was growing the regularly available pigeonpea variety and managed to get a yield of 1.5 tons per ha. But now I am growing improved varieties and also adopting advanced technology and my yield of pigeonpea has increased to 2.5 tons per ha.”

On the second day of the workshop, at ICRISAT, Patancheru, information on the 11 products from the project, was shared. Dr Rajeever Varshney, Research Program Director, Grain Legumes, ICRISAT, while presenting the products, said, “Markers for enhancing seed protein content is important work, and is also a criteria of the Indian government, and the outcome from this project will feed into the pulse revolution that the Prime Minister of India is talking about.”

According to Dr Servejeet Singh, ADR (Seeds) cum Head of Plant Breeding & Genetics, Rajasthan Agricultural Research Institute, Jaipur, “Farmers in Rajasthan are looking for a pigeonpea variety that will fit into the crop rotation with wheat. The products from this project are promising and we hope to get a good variety suitable for the drought-prone state.”

Dr IP Singh, Project Coordinator, Indian Council of Agricultural Research (ICAR) - All-India Coordinated Research project (AICRP) Pigeonpea, appreciated the efforts on the new material generated and stated that sharing the available material through the AICRP centers should be taken up as the reach out will be greater through the large network existing throughout the country. He said, “Phytophthora blight incidence in pigeonpea is also high, and disease resistance varieties for this should also be considered.”

Prof Scott Jackson, Professor, University of Georgia, USA, a member of the project advisory committee, stated that it was interesting to see the collaboration between the public and private seed companies, and the lab to land link being established.

The workshop was attended by project partners from across the country; representatives from key public pigeonpea research centers; private sector representatives from India and Africa; along with USAID officials and project advisory committee members.

Later the Project Advisory Committee (PAC) met to discuss the detailed progress of Phase I. Project partners presented the detailed progress from each center and Dr Varshney presented a tentative plan for Phase II.

For more on Pigeonpea: http://exploreit.icrisat.org/page/pigeonpea/687

Investor: United States Agency for International Development (USAID)
Partners: Agricultural Research Station (ARS) - Gulbarga, University of Agricultural Sciences (UAS), Raichur, Gulbarga, India; National Bureau for Plant Genetic Resources (NBPGR), New Delhi, India; Agricultural Research Station (ARS) - Tandur, PITS Agricultural University, Hyderabad, India; ICRISAT
CGIAR Research Program: Grain Legumes
New technologies to enhance chickpea productivity and production in Ethiopia

Accelerating genetic gains of drought tolerant chickpea; adoption of ‘Breeding Management System’ (BMS) - software to help breeders manage their day-to-day activities through all phases of the breeding program; and release of new varieties nationally and regionally are some of the plans that scientists and partners are working on in Ethiopia for the Tropical Legumes III (TL III) Project.

The TL III project aims to integrate the genomic resources developed in Tropical Legumes I (TL I) with the applied breeding and seed delivery initiatives of Tropical Legumes II (TL II).

Genomic resources from TL I

TL I made a significant contribution in developing high throughput genotyping and phenotyping platforms, identifying genomic regions (markers) associated with resistance to key biotic and abiotic constraints. In chickpea, a marker for drought tolerance was discovered and transferred via Marker-Assisted Backcrossing to several locally adapted genetic backgrounds in Ethiopia and these derived lines showed substantial promise in multi-location tests, said Dr Asnake Fikre, Principal Investigator of TL II project, and Director of Crops Research at the Ethiopian Institute of Agricultural Research (EIAR).

Further work in introgressing this marker into other adapted chickpea varieties in Ethiopia will be done under TL III. Genetic gain will also be accelerated by institutionalizing marker-assisted breeding for drought resistance and other traits.

Breeding and seed delivery gains from TL II

During the TL II project, seven chickpea varieties were released in Ethiopia. A total of 20,022.3 t of high quality seed of 15 varieties was produced. About 136 Farmer Participatory Varietal Selection (FPVS) trials were conducted with 10,461 farmers and 15 varieties were evaluated.

The selection criteria of farmers included:
- Early maturity – to avoid end-season drought and reach the market while prices are still high;
- Vegetable type for local niche markets;
- High yield potential and profuse podding;
- Large seed size for domestic consumption/local and international markets;
- Resistance to terminal drought, Fusarium wilt and Ascochyta blight.

TL III will work alongside other national programs such as N2Africa - Putting nitrogen fixation to work for smallholder farmers in Africa; United States Agency for International Development (USAID) - Integrated Seed Sector Development (ISSD); Alliance for a Green Revolution in Africa’s (AGRA) Scaling Seeds and Technologies Partnership (SSTP); National Agricultural Research System (NARS) partners; and NGO extension efforts in creating awareness on improved varieties and associated integrated crop management practices. The project will use established work plan highlights

**Trait Discovery Pipeline:**
- Crossing, evaluation and selection of segregating population of chickpea accessions for disease resistance and grain yield
- Development of Multi-parent Advanced Generation Intercross (MAGIC) chickpea populations for Kabuli and Desi type chickpea

**Test Genotypes**
- Generation of heat tolerant, high yielding and early maturing chickpea varieties
- Generation of cold tolerant, high yielding and early maturing chickpea varieties

**Application of IBP**
- Collection and evaluation of phenotyping data using modern tools and platforms of IBP
- Management and sharing of pedigree, genotyping and phenotyping datasets

**Developing breeding lines:**
- At least 30 early-maturing drought and heat tolerant breeding lines
- 20 breeding lines for Fusarium wilt resistance with Ascochyta blight resistance
- 20 breeding lines with herbicide tolerance and/or suitability to mechanical harvesting developed
- At least 10 breeding lines/cultivars requiring less cooking time than available popular cultivars identified and developed.

**Release of new varieties, FPVS and demos:**
- Beginning this year, project partners led by DZARC will work towards release of new varieties nationally and regionally depending on adaptation and local preferences.
- 27 FPVS were planned. They are well above the 10 targeted in the proposal.
- 135 demos were planned. Well above the 80 targeted in the proposal.

For more on chickpea: [http://exploreit.icrisat.org/page/chickpea/685](http://exploreit.icrisat.org/page/chickpea/685)
Elminating hunger by investing in agriculture and rural development

More than 400 people joined the Zero Hunger Challenge conference conducted in unison with and to celebrate the 90th birthday of Prof MS Swaminathan. Attendees were from the full range of sectors including farmers, community groups, students, private sector, development donors, NGOs, researchers, and policy makers.

Outcomes from the conference – Science, technology and public policy for achieving the Zero Hunger Challenge

The key focus areas were:

- **Empowering women** to significantly increase productivity thereby leading to more benefits to the whole family and providing a better livelihood for women
- **Nutrition efforts** ranging from village and classroom gardens to making more nutritious crops like millets and legumes more economically viable
- **Making smallholder farming profitable** by connecting farmers to equitable markets
- **Attracting youth to agriculture** through sustainable intensification and application of modern tools that include ICT and mechanization
- **Overcoming marketing challenges** by linking farmers to markets and through policy support (eg minimum price support for more nutritious and resilient crops like millets)
- **Stronger adoption approaches** which include rethinking how we partner and engage
- **Sustainable food systems** maintained by farmers and policy makers
- **Overcoming crop losses** which is more of a ‘societal’ issue and not just an agricultural issue
- **Ability to communicate** science in clear simple ways and to continually keep communicating
- **Put farmers at the center of any innovation** ensuring they are part of developing the solution and benefit from it
- **Multi-sector approach towards developing and delivering solutions** is needed and silos have to be broken down – science alone will not achieve ‘zero hunger’ goals

ICT’s role to make major advancements was recognized in extension and for better production and marketing decisions by farmers

- **Role of policy** to provide more stable markets for farmers
- **Soft skills for scientists** required to ensure demand-driven innovation along the value chain

Dr David Bergvinson, Director General, ICRISAT, in his presentation said, “We need to have a shared vision. This is what happened in the green revolution where scientists and policy makers and farmers came together towards a common cause and really enabled a tremendous transformation in the agriculture sector during the 1960s in India and Pakistan. Professor MS Swaminathan really embodied that approach of ownership and building a coalition.... The zero hunger challenge has to be achieved through a coalition of diverse stakeholders that is centered on the needs and aspirations of farm families.”

For more, see web edition

New technologies to enhance chickpea... from page 3

network of seed producers, establish new ones and strengthen the ones created during the TL II project, said Dr Chichaibelu Mekasha, Crops Research Process Representative, EIAR-Debre Zeit Agricultural Research Center (DZRC), and the TL III focal person for Ethiopia.

More plans for TL III

At a recent planning meeting for TL III, animated discussions took place on the capacity of EIAR-DZRC and its network of partners to deliver on its breeding and seed systems objectives. The planned assessment of breeding efficiency and implementation of recommendations is expected to lead to improved operational protocols, improved experimental design and the use of new analytical methods and tools, including the adoption of ‘Breeding Management System’ (BMS) developed by the Integrated Breeding Platform (IBP).

A total of 34 participants including members of Chickpea and Lentil Research Group of DZARC, partners from Regional Agricultural Research Institutes (RARIs), and Dr Christopher Ochieng Ojiewo, Senior Scientist - Legumes Breeding (ESA) (Grain Legumes), ICRISAT, attended the planning meeting that was conducted at DZARC from 3-5 August.

Project: Tropical Legumes III
Investor: Bill & Melinda Gates Foundation
CGIAR Research Program: Grain Legumes
Partners: See web version

Professor Swaminathan has developed six basic principles for his foundation – MSSRF. His motto is “Focus on brains not bricks. You can have principles but only people can implement these, not bricks.”

ICRISAT is a member of the CGIAR Consortium
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