

Discovery and conservation of **CROP GENETICS**

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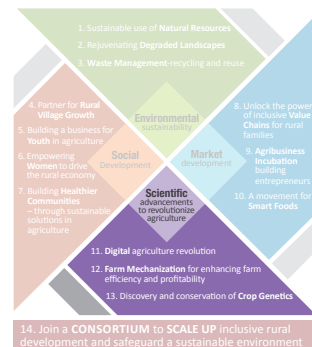
Long-term **protection of crop genetics**

Unlocking the potential of genomics for **future food production**

Coping measures for **climate change**

Be ready to **tackle pest and disease crises**

Reduce poverty and provide **nutritious food**



Recent advances in genomics and molecular breeding technologies provide new opportunities to accelerate breeding of advanced crops.

The new technologies can provide faster, cheaper and reliable genotyping data and ultimately new crop varieties that are high yielding and biofortified, leading to better nutrition, better resistance to pests and diseases and greater ability to cope with climate change.



Impact pathway

1 Genebank operations – long-term conservation of genetic material

2 Characterizing genetic diversity in the genebanks by evaluating entries under specific stresses

3 Identifying traits developed by farmers of yester-year to help farmers of today deal with climate change and increase nutritional quality and profitability

4 Using this genetic diversity to accelerate the development of nutritious varieties using advanced genomic technologies and bioinformatics



(Left) Dr Swaminathan speaking at the closing session; (Right) A standing room audience listening in rapt attention.

Next-generation genomics key to global food and nutritional security



Intensifying genome sequencing work for drought proofing crops in Karnataka, India

The Government of Karnataka, India, has requested ICRISAT to lead the coordination of the state government's initiative on sequencing and molecular breeding of finger millet.

ICRISAT's experience on coordinating complex genome sequencing projects with targeted product delivery was shared with the Karnataka state Agriculture Minister, Mr Krishna Byre Gowda, and other senior government officials at a recent meeting 'Decoding genome sequence for strengthening the genetic improvement of finger millet'.

Dr Rajeev K Varshney, Research Program Director-Grain Legumes, ICRISAT briefed the participants on the genome sequencing-related activities at ICRISAT.

Further discussions involving sorghum and pigeonpea improvement for Karnataka state were also held. ICRISAT's Drs Santosh Deshpande and Rachit Saxena,



Dr Varshney briefing Karnataka state government officials on genome sequencing-related work at ICRISAT.

provided an overview of ICRISAT's activities on sorghum and pigeonpea improvement.

The officials suggested developing molecular breeding projects in partnership with concerned Karnataka State Agricultural Universities.

Activities for all crops will be part of an existing MoU between ICRISAT and Karnataka on drought proofing crops. The meeting was held in Bangalore on 18 July. ■

Genomics of plant genetic resources for global food security

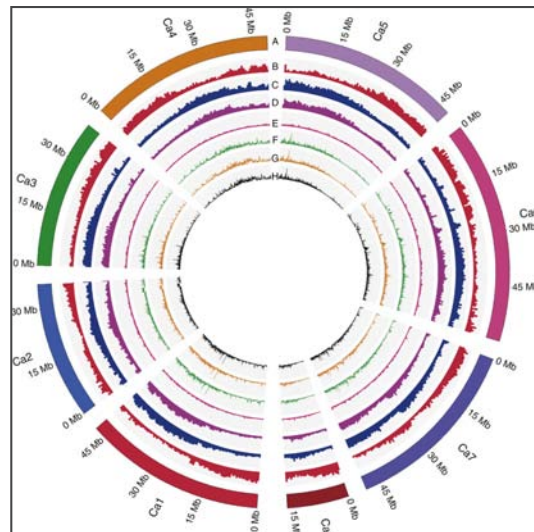
The world's population is projected to reach 10 billion by the year 2050, which will require a 70-100% increase in food production amid the effects of climate change that threaten food security across the globe. New scientific tools like genomics of plant genetic resources are the world's best option to meet the food production requirement in the next 40 years.

"With the rapid advancement of genomics research, gene sequences should be available hopefully in the next 3-4 years for all plant species of economic importance. But the most important challenge to the scientific community will be to utilize these gene sequences and genome sequence diversity for crop improvement for food security, as well as for conserving biodiversity," emphasized Dr CLL Gowda, Program Director - Grain Legumes, in the inaugural address he delivered on behalf of Director General William D. Dar at the 3rd International

Symposium on Genomics of Plant Genetic Resources (GPGR3).

Tackling the challenges of addressing global food security today and in the future, GPGR3 is being held this week, 16-19 April, in Jeju Island, South Korea.

ICRISAT, in the last two years, has led a global research team in completing the genome sequencing of chickpea and pigeonpea, two important legume crops and major protein sources of the poor in the dryland tropics. "By the end of 2014, we should have



Using new genomics tools for sorghum improvement

New genomics tools can address urgent needs for a more drought resilient food supply, increase rates of sorghum improvement to better meet long-term population growth, and investigate production systems that promote sustainable farming, particularly regarding preservation and/or restoration of soil resources and water quality.

This is the aim of the project Feed the Future Innovation Lab for Climate Resilient Sorghum. The project is an international initiative led by University of Georgia's Plant Genome Mapping Laboratory and involving partners from USA, South Africa, Ethiopia, Mali and ICRISAT. The project is funded by the United States Agency for International Development (USAID).

The project launch and first-year review meeting was held in Addis Ababa, Ethiopia recently. "We have spent over 20 years building genomic tools and fundamental knowledge of sorghum and this is an

exciting opportunity to put all this research to work, especially for the region from where sorghum has originated," said Regents Professor Andrew Paterson, project lead, University of Georgia (UGA).

Dr Stefania Grando, Research Program Director, Dryland Cereals, ICRISAT stressed on the importance of the project for the program and its further linkages & integration to research activities across regions within CGIAR Research program on Dryland Cereals.

The project partners presented progress for their respective activities under two major goals: improving sorghum's drought and heat tolerance, and improving ratooning ability in sorghum. The independent technical advisors to the project: Prof Samuel Gudu (Rongo University, Kenya), Dr Frew Mekbib (Haramaya University, Ethiopia) and Dr Abdalla Mohamed (Senior Sorghum Breeder, ICRISAT-Ethiopia), gave suggestions for further strengthening activities for second year. ■



**International Crops Research Institute
for the Semi-Arid Tropics**



About ICRISAT: www.icrisat.org

ICRISAT's scientific information: EXPLOREit.icrisat.org

Dr David Bergvinson | D.Bergvinson@cgiar.org
Director General, ICRISAT

Joanna Kane Potaka | j.kane-potaka@cgiar.org
Director, Strategic Marketing and Communication

Dr Suhas Wani | s.wani@cgiar.org
Director, ICRISAT Development Center