

New Initiatives in Agriculture Biotechnology

Amongst the major ongoing programmes, the department has initiated a major mission mode programme on “**Characterization of Genetic Resources**” in various crops. The mission mode programme is aimed at sequencing/re-sequencing and phenotypic characterization of available germplasm resources of Oilseeds (Sesame, Linseed, Safflower, Niger), Cereals (Rice and Wheat) and Pulses (Chickpea) in country along with exotic lines from diverse agro climatic regions & elite lines of International Institutes. A total of 69789 **accessions of various crop plants** (Rice: 15251; Wheat: 7000; Chickpea: 14651; Finger millet: 11199; Linseed: 2748; Safflower: 7000; Sesame: 9840; Niger: 2100) will be characterized by genotyping/phenotyping. The projects will provide information on new genes to combat biotic, abiotic stresses and nutrition. Under the mission programme 6 major all India network projects were approved and one is under approval. The detail of network projects is as following:

Sl. No.	Project Title
1.	Exploitation of genomic resources for improvement of niger (<i>Guizotia abyssinica</i> L.F. Cass) through breeding and biotechnological tools.
2.	Exploiting Genetic Diversity for Improvement of Safflower through Genomics-Assisted Discovery of QTLs/Genes Associated with Agronomic Traits
3.	Mainstreaming sesame germplasm for productivity enhancement and sustainability through genomics assisted core development and trait discovery
4.	Leveraging genetic resources for accelerated genetic improvement of Linseed using comprehensive genomics and phenotyping approaches
5.	Germplasm Characterization and Trait Discovery in Wheat using Genomics Approaches and its Integration for Improving Climate Resilience, Productivity and Nutritional quality
6.	Mainstreaming rice landraces diversity in varietal development through genome-wide association studies: A model for large-scale utilization of gene bank collections of rice.
7.	Characterization of Chickpea Germplasm Resource to Accelerate Genomics-assisted Crop Improvement. (Under consideration for approval)

- Improvement of legumes is also one of the priority areas of Department. Department has initiated a mission program on “**Genetic Enhancement on Pulses**”. Programme envisages development of improved varieties for productivity and disease/climate resilience. A major network project entitled “Genetic Enhancement on minor pulses: Characterization, Evaluation, Genetic Enhancement and generation of Genomic Resources for Accelerated utilization and improvement of minor pulses” has been supported under the Mission programme on Genetic Enhancement of Pulses.

- Department has also initiated a major network programme on “**Pathogenomics of Plant Viruses**” as plant viral diseases are a major cause of crop yield losses around the world. India with its agro climatic diversity provides an ambient environment to the pathogens to flourish which ultimately leads to losses in the agricultural sector in terms of both quality and quantity. R & D in this direction is an important step considering Bio-security implications on food security.

Some of the other major ongoing projects/new initiatives include:

- National Genomics and Genotyping Facility (Phase I) anchored at National Institute of Plant Genome Research (NIPGR), New Delhi
- DBT-UDSC Partnership Centre on Genetic Manipulation of Brassicas.
- Development of superior haplotype based near isogenic lines (Haplo-NILs) for enhanced genetic gain in rice
- Mission Programme on “Minor oilseeds of India origin” (Linseed, Safflower, Niger and Sesame).
- Establishing a Genomic selection and speed breeding facility at ISARC, Varanasi.
- Indo-UK Crop Science fellowship for capacity building.