The Indian Agricultural Research Institute, New Delhi, invites applications from PhD students across the country for ten working days in **Short term training** on "**Genomics for Improvement of Horticultural Crops**" sponsored by **NAHEP-Centre for Advanced *Agricultural Science and Technology* (CAAST)**, Indian Council of Agricultural Research, New Delhi.

WHO CAN PARTICIPATE

The students pursuing PhD/MSc degree in Horticulture across the country with research work in breeding/genetics/biotechnological aspects of horticultural crops are eligible to apply. The number of participants will be limited to **twenty five ONLY.**

REGISTRATION FEES: No registration fee is to be paid; the programme is fully sponsored by NAHEP-CAAST

HOW TO APPLY

Complete application form in the prescribed format forwarded by the competent authority should reach the **Course Director, Division of Vegetable Science, ICAR-IARI, New Delhi** on or before **31st December 2019**; application form can be downloaded from www.iari.res.in

TRAVEL

The candidates are eligible for T.A. only for travelling by mail/express train to the maximum of AC III tier and chair car fare by the shortest route.

FOOD and ACCOMMODATION

Food will be served during the programme and expenditure will be met from the training budget. The accommodation will be arranged for the participants at IARI- guest house

DURATION

February 24 to 05 March, 2020

VENUE

Lecture hall, Divisions of Vegetable Science and Fruits & Horticultural Technology, ICAR-Indian Agricultural Research Institute, Pusa Campus, New Delhi-110012.

Organizers

Course Director

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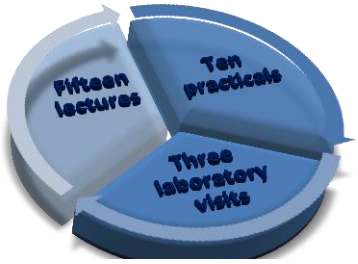
The programme is coordinated by
Division of Vegetable Science, ICAR-IARI



National Agricultural Higher Education Project (NAHEP)

Sponsored

Training programme on

Genomics for Improvement of Horticultural Crops

February 24 -05 March, 2020
at
Division of Vegetable Science
ICAR-IARI, Pusa Campus, New Delhi

IARI

Organized by
Center for Advanced Agricultural Science and Technology (CAAST)

ICAR-Indian Agricultural Research Institute
New Delhi- 110012

About NAHEP-CAAST

Centre for Advanced Agricultural Science and Technology (CAAST) is a new initiative and student centric sub-component of **World Bank** sponsored **National Agricultural Higher Education Project** (NAHEP) granted to IARI to provide a platform for strengthening educational and research activities of post graduate and doctoral students. CAAST theme for IARI is **Genomic assisted crop improvement and management** that specifically aims at inculcating genomics literacy and skills among the student of IARI.

Background

Global food production needs to keep pace with ever growing human population of 7 billion that is expected to touch 10 billion by 2050. In order to sustain crop production with shrinking cultivable area, enhancing horticultural productivity is one of the major goals. Besides production, the nutritional security can also be enhanced through increasing horticulture production by reducing the losses due to biotic and abiotic stress factors.

Recently, genomics and other biotechnological tools played an important role in conventional breeding, by use of molecular markers and genome information for breeding purposes. This has led to production of disease-free planting material, better quality fruits, improved shelf life, increased availability of bio-formulations, etc. The main areas of biotechnology that are adopted for crop improvement include micropropagation, genetic engineering, molecular diagnostics, genomics, DNA finger printing, molecular markers/breeding, recombinant DNA technology, association mapping, and marker-assisted selection etc. DNA markers can be utilized to determine the plant ancestry or eugenics, extent of genetic diversity, gene tagging, linkage map development, as well as selection for quantitative traits which shows continuous phenotypic variation. In addition, studying the molecular marker-based genetics of horticultural traits can help to achieve decisive breeding strategies and map-based gene isolation. This helps the breeders to incorporate the genes which are not previously available into the commercial cultivars, thus creating the novelty in existing phenotypes.

Efforts to bring marker-assisted breeding (MAB) into wide adoption for horticultural crop improvement will benefit from targeted utilization of synteny among related crops and information from model plants to develop markers for use in standard breeding methods, e.g., backcrossing, and in new approaches such as genomic selection. Efficiency can be improved and some costs reduced in ongoing breeding programs by implementing MAB when important breeding issues receive appropriate attention.

Genomic research has great potential to revolutionize the molecular biology research in horticultural crops in many ways. Availability of NGS technologies like FLX-454, Illumina, SOLiD and Helicose have brought hope to generate genomic resources for many more horticultural crop species in a recent years' time. NGS technology is being adopted due to less cost and time involvement in comparison to first-generation sequencing. In order to harness the potential of the genome information, we need to create appropriate infrastructure facilities and human resources to face the challenges in the coming decades.

Genomics and plant genome initiatives at IARI

The ICAR-IARI, New Delhi has made significant contributions in developing crop protection and production technologies for all major crops including horticultural crops in India. The institute has core strength in the area of genomics and modern research facilities for conducting advanced genomics programmes. Recently the institute has published the world's first web-based genomic resources for genetic improvement and germplasm management of mango in collaboration with ICAR-NIPB, New Delhi. This web genomic resources can be of immense use in the development of high density linkage map, QTL discovery, varietal differentiation, traceability, genome finishing and SNP chip development for future GWAS in genomic selection program. ICAR-IARI and ICAR-NIPB contributed sequencing of the gene-rich region of the tomato chromosome 5 and provided further support to generate 5-fold sequence coverage of the entire tomato genome by Next Generation Sequence (NGS) technology. With this background the **Centre for Advanced *Agricultural Science and Technology* (CAAST) under NAHEP** is organizing **Short term training** on "**Genomics for Improvement of Horticultural Crops" for the benefit of students of National Agricultural Research Systems.**

COURSE OUTLINE

The training has the following components:

A. Lectures on principles and practices of basic & advanced genomic techniques used in Horticultural Crops

The lectures will be delivered in the forenoon during the training period. Evolution of various pre- and post-genomic era techniques used in improvement of Horticultural crops will be discussed.

B. Demonstration and visits for Sequencing and computing facilities

Video demonstrations on genomic library preparation for whole genome sequencing. Visit to facilities like Confocal Microscope, Genome sequencers, Bioinformatic data center, Phenomics facility, etc. Special visits will be made to different Institutes working on Genomic research like NIPGR, ICGEB etc.

C. Group activities for case studies

Student groups will be allotted a set of plant samples to characterize using genomic tools.

D. Interactive discussion, presentation and Quiz

Each student is expected to make a short presentation of their present work and future work plan on next generation sequencing, GWAS, QTL mapping, gene cloning and marker assisted selection (MAS). Presentation will be facilitated by coordinators during evening hours on all days during the programme. Students are also encouraged to bring their own plant sample materials to work with.