

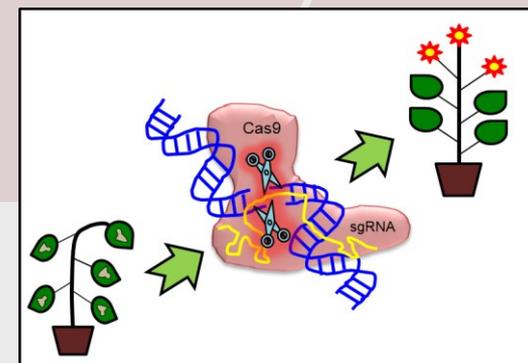
# National Agricultural Higher Education Project (NAHEP)

Sponsored

Training Programme

ON

CRISPR-based Plant Genome  
Editing: Tools and Techniques



**Oct 11, 2022 – Oct 21, 2022**

Organized by

Center for Advanced Agricultural Science  
and Technology (CAAST)

ICAR-Indian Agricultural  
Research Institute

&

ICAR- National Institute for Plant  
Biotechnology ,  
New Delhi-110012



## Course Director

**Dr. Viswanathan Chinnusamy**

Principal Investigator, NAHEP-CAAST &  
Head (Acting), Division of Plant Physiology,  
ICAR-IARI, Pusa Campus, New Delhi-110012  
Email: [V.Chinnusamy@icar.gov.in](mailto:V.Chinnusamy@icar.gov.in)  
Phone: 91-11-25842815, 09013885245

## Co-Course Director

**Dr. RC Bhattacharya**

Principal Scientist,  
ICAR-National Institute for Plant Biotechnology,  
Pusa Campus, New Delhi-110012  
Email: [rcbhattacharya1@gmail.com](mailto:rcbhattacharya1@gmail.com);  
[Ram.Bhattacharya@icar.gov.in](mailto:Ram.Bhattacharya@icar.gov.in)  
Phone: 09868357986

## Course Coordinators

Dr. Pranjal Yadav (Senior Scientist, ICAR-IARI), Dr.  
Soham Ray (Scientist, ICAR-IARI), Dr. Archana Watts  
(Scientist, ICAR-IARI), Dr. Shivani Nagar (Scientist,  
ICAR-IARI) & Dr. Anshul Watts (ICAR-NIPB)

## Venue

Lectures: G.S. Sirohi Hall, Division of Plant  
Physiology, ICAR-Indian Agricultural Research  
Institute, New Delhi-110012.

Practical: PG laboratory, National Institute for Plant  
Biotechnology & Division of Plant Physiology, ICAR-  
Indian Agricultural Research Institute, Pusa Campus,  
New Delhi-110012.



## HOW TO APPLY

The complete application form in the prescribed  
format forwarded by Head of the institute or  
Department authority should reach the **Course  
Director, NAHEP-Centre for Advanced Agricultural  
Science and Technology (CAAST), Division of Plant  
Physiology, ICAR-IARI, New Delhi** on or before **12<sup>th</sup>  
September 2022**. Please send the **types application  
form (Not hand written)**. Application form can be  
downloaded from IARI website  
(<https://www.iari.res.in>). Scanned copy of duly filled  
application form along with supporting document in a  
single combined pdf file should be sent to  
[nahep.caast.iari@gmail.com](mailto:nahep.caast.iari@gmail.com). Selected candidates will  
be intimated by email on or before **15<sup>th</sup> September  
2022**.

## WHO CAN PARTICIPATE

**MSc and PhD students of ICAR-Deemed to be  
universities/SAUs/CAUs/CUs/ other UGC recognized  
Universities and Research Institutes** are eligible to  
apply. A maximum of **25 participants** will be selected  
for participation in the training programme.

## REGISTRATION FEES

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

## IMPORTANT DATES

**Last Date for applications: 12<sup>th</sup> September 2022**

**Duration of Training: 11<sup>th</sup> Oct 2022 – 21<sup>st</sup> Oct 2022**

**Intimation of Selection: 15<sup>th</sup> September 2022**

## TRAVEL

Travelling allowances will be provided by the  
organizers as per the norms. Participants should  
produce a certificate that they have not been given  
TA/DA by their host institute (Head of the  
Department/Institute). Selected trainees are entitled  
for III AC tickets.

## FOOD and ACCOMMODATION

Food and accommodation will be arranged in IARI-  
guest house. Tea and snacks will be served during the  
programme and expenditure will be met from the  
training budget.

## 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 resource management that specifically aims at inculcating genomics skills among the students.

## BACKGROUND OF THE TRAINING

Genome editing is the new technology in the field of biological science that empowers researchers to precisely edit naturally existing alleles of a gene in any organism. In the field of plant science, it holds the potential to breed new designer crops with better resource use efficiency, stress tolerance, quality and yield. To harness the complete benefit of this new breeding tool trained human resource in this specific research field is of paramount importance. Keeping this in view, this training course has been designed for the students that will introduce the basics of genome editing in plants, provide an overview of the general principles of CRISPR biology and the use of CRISPR-Cas9 as a tool for plant genome editing. Trainees will have a hands-on experience on aspects such as guide RNA designing, vector selection, vector construction, *Agrobacterium* mediated plant transformation, identification of mutants, and molecular characterization of mutant lines; etc. Success stories and future perspective for this upcoming technology will be shared by the eminent researchers in this field. The trainees will be made acquainted with the ethical concerns associated with genome editing technology and also with the current legislative guidelines for practicing this technology.

## OBJECTIVE OF THE TRAINING

- To provide hands-on training on vector selection, guide RNA designing and cloning.
- To train the participants in computational tools used for CRISPR-based editing
- To perform molecular analysis of transgenic and genome edited lines.
- To develop the human resource and promote the use of genome editing for crop improvement.

## About the Organizing Institutes

**ICAR-Indian Agricultural Research Institute (ICAR-IARI)** is the country's premier institution for agricultural research, education and extension (A+ NAAC Ranking). It has been serving the cause of science and society with distinction through basic research, generation of new technologies and development of human resources. The Division of Plant Physiology, established in 1966, undertakes basic and strategic research with a view to understand the processes leading to solution of problems in crop productivity. The division has pioneered in improving drought and salt tolerance in rice through genome editing of *dst* gene in mega rice variety MTU1010 using CRISPR-Cas9.

**ICAR-National Institute for Plant Biotechnology (ICAR-NIPB)** being a sister institute of IARI is specifically mandated to molecular biology and biotechnology research in crop plants. NIPB has fostered and delivered several biotechnology products namely, mustard variety Pusa Jaikisan, MAS derived rice variety Improved Pusa Basmati 1, CMS lines of mustard, blast resistance gene Pi54 in rice etc. The institute hosts state of the art laboratory facilities for plant biotechnology research. It offers Ph.D. and M.Sc. degree programmes in Molecular Biology and Biotechnology as a teaching discipline of Post Graduate School, IARI.

With this background, the **Centre for Advanced Agricultural Science and Technology (CAAST)** proposes a training programme sponsored by **National Agricultural Higher Education Project (NAHEP)** on **"CRISPR-based Plant Genome Editing: Tools and Techniques"** for the benefit of the post graduate and doctoral students.



## COURSE OUTLINE

### A. Lectures on Genome Editing Technology and its application in Plant Genetic Engineering

The lectures will be delivered in the forenoon sessions of the training period where application of genome editing in genetic engineering will be discussed.

### B. Hands-on training session on development and handling of genome edited plants

Hands-on training sessions will be conducted on different aspects of genome editing viz., guide RNA design, development of gene constructs, validation of the gene constructs, methods of delivering genome editing machinery into the cells, molecular analysis of genome edited lines, analysis of off targets, generation of transgene-free mutants; etc. Exposure visits will be arranged to the glass-house and net-house facilities where genome edited plants are analyzed and maintained before further trial.

### C. Group activities for case studies

Trainee-groups will be assigned activities on developing research proposals that utilizes genome editing technology related to their ongoing research project/area of interest.

### D. Interactive discussions, presentations and short tests

Each student is expected to make a short presentation of their present work and future work-plan on application of genome editing in their ongoing research. Presentation will be facilitated by coordinators during evening hours on all days during the programme. Students are also encouraged to bring their own biological material to work with.

**Prevailing weather condition during the training period:** Mostly pleasant with temperature ranging between 20-25°C.

The programme is coordinated by  
PG School, IARI & ICAR-NIPB, IARI Campus

**NAHEP-CAAST**  
**ICAR-Indian Agricultural Research Institute**  
**New Delhi 110 012**

**Application form for NAHEP sponsored training programme on "CRISPR-based Plant Genome Editing: Tools and Techniques" from Oct 11, 2022 – Oct 21, 2022**

<b>1. Name</b>					:	
<b>2. Gender (Male or Female or others)</b>					:	
<b>3. Division and Degree programme</b>					:	
<b>4. Age and date of birth</b>					:	
<b>5. Communication address</b>					:	
<b>6. Phone &amp; Email</b>					:	
<b>7. Permanent address (For use in case of emergency)</b>					:	
<b>8. Educational qualifications (From Graduation onwards)</b>					:	
<b>Degree</b>	<b>Subject</b>	<b>Year</b>	<b>Percentage of marks/Division</b>	<b>Name of the University</b>		
<b>i.</b>						
<b>ii.</b>						
<b>iii.</b>						
<b>iv.</b>						
<b>v.</b>						
<b>9. Research activities</b>						
<b>a. Area of PhD or MSc research and title of approved thesis title (Attach ORW/synopsis)</b>					:	
<b>b. Indicate the future plans on utilizing the technical expertise gained from the winter school programme in your research (Attach Separate Sheet if necessary)</b>					:	
<b>c. Indicate whether you have attended any similar training programme earlier</b>					:	
<b>10. Write in brief (not exceeding 100 words) about the expected benefits of this training.</b>						

**Signature of the Applicant**

**Forwarding note by Chairman/Guide**

**Endorsement & Seal of the Dean/Registrar**

Scanned copy of duly filled application form along with supporting document in a single combined pdf file should be sent to [nahep.caast.iasi@gmail.com](mailto:nahep.caast.iasi@gmail.com).