

## Date and venue

The training period is for ten days (Nov. 10 to 19, 2025), at Assam Agricultural University, Jorhat 785013, Assam. Selection of the applicants will be on a first-come-first-served basis, fulfilling basic criteria. Accommodation will be provided for the off-campus participants at the AAU, Jorhat. Duly filled-in application may be sent, latest by 25<sup>th</sup> September 2025, to Dr N. Sarma Barua, Co-convener Department of Plant Breeding & Genetics, Assam Agricultural University, Jorhat, Assam - 785013.

## Important Dates:

Last date for receipt of applications:

25- Sep -2025

Intimation to selected candidates:

30- Sep- 2025

Participants will be reimbursed maximum of III tier A.C. train fare for the shortest possible route from their HQs to AAU, Jorhat and back on production of documentary evidence. Local hospitality (Lodging & Boarding) will be provided.

## For more information, please contact:

Dr. N. Sarma Barua (Co-convener), Professor, Department of Plant Breeding and Genetics, Assam Agricultural University, Jorhat-785013, Assam. Mobile: 9435352796/7002675636  
E-mail: [nagendra.sarmabarua@aaau.ac.in](mailto:nagendra.sarmabarua@aaau.ac.in)  
[nsbarua63@yahoo.co.in](mailto:nsbarua63@yahoo.co.in)

Dr. B. K. Das (Course Coordinator)  
Nuclear Agriculture & Biotechnology Division, BARC, Mumbai 400 085. Tel: 022-2559-2640  
E-mail: [bkdas@barc.gov.in](mailto:bkdas@barc.gov.in), [bkdas.barc@gmail.com](mailto:bkdas.barc@gmail.com)

## Short-Term Hands-on Training Programme On

### "Recent Advances in Mutation Breeding for Crop Improvement"

November 10 - 19, 2025

Assam Agricultural University,  
Jorhat, Assam-785-013



Organized by



Bhabha Atomic Research Centre (BARC),  
Mumbai

in collaboration with

Assam Agricultural University Jorhat

[Sponsored by Board of Research on Nuclear Sciences (BRNS), Department of Atomic Energy (DAE), Government of India]

## Advisors :

Dr. P. A. Hassan, Associate Director, BSG, BARC, Mumbai  
Dr. S. K. Chetia, Director of Research (Agri), AAU, Jorhat  
Dr. P. K. Pathak, Dean, Faculty of Agriculture, AAU, Jorhat  
Dr. A. K. Das, Director Post-graduate Studies, AAU, Jorhat

**Convener:** Dr. A. D. Ballal, Head, Nuclear Agriculture & Biotechnology Division, BARC, Mumbai - 400 085

**Co-Convener:** Dr. N. Sarma Barua, Professor, Department of Plant Breeding & Genetics, Assam Agricultural University, Jorhat -785013

**Organizing Secretary:** Dr. K. K. Sharma, Professor & Head, Department of Plant Breeding & Genetics, Assam Agricultural University, Jorhat - 785013

**Course Coordinators:** Dr. B. K. Das, SO (H), Nuclear Agriculture & Biotechnology Division, BARC, Mumbai 400 085.

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Dr. Debojit Sarma, Professor, Department of Plant Breeding & Genetics, Assam Agricultural University Jorhat - 785013

## Application Form

Short-Term Hands-on Training Programme on  
"Recent Advances in Mutation Breeding for  
Crop Improvement"

November 10 - 19, 2025

AAU, Jorhat, 785-013

## Format for the application

(Type or write in capital letters)

Name (Dr./Mr./Mrs./Ms):

Name of Organization:

Date of Birth: .....

Designation/Occupation

Areas of specialization:

Research Topic: .....

Years of experience: .....

Accommodation required: Yes / No

Address for correspondence: .....

Mobile.....

E-mail.....

Recommendations  
HoD's Signature & Seal  
.....

Signature of  
Applicant  
.....

The participants can submit soft copy by email to: [nagendra.sarmabarua@aaau.ac.in](mailto:nagendra.sarmabarua@aaau.ac.in) at the earliest and also send the signed hard copy of the application form to **Dr. N. Sarma Barua (Co-Convener)** through proper channel. Participants will be intimated about their selections latest by **30<sup>th</sup> September, 2025**.



### About BARC:

Bhabha Atomic Research Centre (BARC) is a premier research organization engaged in research work in the areas of nuclear and basic sciences. In the field of agriculture, BARC has been working for the past few decades on improvement of crop plants using mutation breeding. Through this programme, BARC (in collaboration with ICAR & SAUs) has released 71 crop varieties of different crops viz. cereals, oil seeds, and pulses. As part of capacity building programme, BARC in collaboration with SAUs is undertaking training to students and scientists on different aspects of radiation technology in agriculture (Mutation breeding for crop improvement).

### About AAU:

Assam Agricultural University (AAU), Jorhat, established on April 1, 1969 is the first institution of its kind in the North-Eastern Region of India. The goal is to produce globally competitive human resources in the farm sector, to carry out research in conventional and frontier areas in agriculture and allied fields and to disseminate the proven technologies for the benefits of the farming community and other stakeholders, while emphasizing on sustainability, equity, food and nutritional security at the village level. AAU has developed 113 crop varieties along with 2 animal breeds and one poultry breed with desirable traits catering to the needs of diverse farming communities of the state, besides other technologies like transgenic chickpea, low-cost polyhouse, package of practices for off-season vegetables and flower production.

### About Department of PBG:

The Department of Plant Breeding & Genetics (PBG) came to existence in 1970 with the mandate of teaching at undergraduate and postgraduate levels and researching basic and applied aspects of crop improvement. The Department follows the new course curricula of the ICAR Dean's Committee recommendation. The PG research aims at developing the students' competence for research and development



in crop improvement. The Department has developed five rice, two green gram and one toria variety.

**Aims/Objectives of the Training:** To train the research community (SAUs & ICAR institutes and Universities) particularly the young researchers of North East Indian states to carry out mutation breeding experiments in more efficient manner & develop varieties suitable for poor & marginal farmers.

## Syllabus

### A) Theory:

- 1) Principles of Mutation Breeding-I:  
Principles of mutation breeding for sexually & asexually propagated crops  
Mutagens: Different types of mutagens (Physical & Chemical Mutagens)  
Mode of action of mutagens, radiolysis of H<sub>2</sub>O
- 2) Practices of Mutation Breeding-II  
Methodology & Screening Techniques  
Genetics; Examples (mutation Breeding for qualitative and quantitative traits)
- 3) *In vitro* mutagenesis:  
Principles  
Methodology for *in vitro* induced mutagenesis  
Methods for screening *in vitro* mutants  
Examples: Salt tolerant, viral disease resistance
- 4) Advanced techniques for inducing mutations in plants:  
Ion beam  
Electron beam, proton beam etc.  
Space /Cosmic radiation  
Advantages/Disadvantages
- 5) Molecular Mutation Breeding:  
TILLING (Targeted Induced Local Lesions IN Genome)  
Insertional mutagenesis  
Sequence based mutagenesis  
Targeted mutation by recent genome editing techniques (CRISPR-Cas9)  
Molecular characterization of mutants, MutMap, MutMap+
- Molecular approaches to identify novel mutants in crop plants (MUT-MAP)
- 6) Miscellaneous  
Role of epigenetics in mutation breeding  
EpiRIL, Epimutants  
Statistical analysis (Principles/Theory) on mutant population

Mutation breeding at BARC and India  
Mutation breeding at IAEA, Vienna  
Irradiation as a tool for bio-pesticides/ bio-stimulant improvement  
Concept of food irradiation, Dosimetry, Food irradiator  
Application of gamma irradiator and electron beam for food irradiation

### B) Practical/Demonstrations:

Determination of LD<sub>50</sub>/GR<sub>50</sub> /GR<sub>30</sub> calculation  
Exposure of seeds to radiation  
preparation of seeds, seedling height studies  
Dose response curve  
Computation of radiobiology expt.  
Field /Lab. screening of mutants  
*In vitro* mutagenesis  
Non-destructive screening of mutants  
Analysis of diversity in mutants & parents using DNA markers

**C) Field visits** to see the mutants in Cereals, Pulses, Oilseeds, Vegetables, etc.

**About Jorhat:** Jorhat, the last capital of independent Assam under the erstwhile Ahom kingdom, is known for its educational, research and cultural ambience. Jorhat houses institutions like AAU, CSIR-NEIST, TTRI, NID, CMER & TI (CSB), RFRI (ICFRE), AWU, KU (private), JEC, JMC, JBC (Autonomous) and other standard colleges and schools. It is well connected with other parts of the country through road, rail and air. AAU is located at a distance of 6.8 km from the railway station and just 3.6 km from the airport. Taxi and auto services are easily available to reach the university.



### Who can participate in this training?

This Training Programme is meant for young researchers/scientists working in SAUs and other R&D institutes, who are involved in crop improvement programme using *in vivo* and *in vitro* mutation techniques. About 25 participants will be selected for the training programme on first-come-first-served basis. PhD students working in mutation breeding aspects can also apply.

