

**World Bank – ICAR sponsored National Agricultural Higher Education Project
Centre for Advanced Agricultural Science and Technology (CAAST) on
Genomics-Assisted Crop Improvement and Management
ICAR-Indian Agricultural Research Institute, New Delhi**

**Environment Management Framework
Environment Sustainability Plan**

Objectives

To

1. Develop online teaching facility and online teaching resources for enhancing the teaching and learning efficiency, and scientific communications skills
2. Develop and/or strengthen the *state-of-the art* next-generation genomics and phenomics facilities for producing quality PG and Ph.D. students
3. Develop collaborative research programmes with institutes of international repute and industries in the area of genomics and phenomics
4. Enhance the skills of faculty and PG students of IARI and NARES
5. Generate and analyse big data in genomics and phenomics of crops, microbes and pests for genomics aided crop improvement and management







World Bank – ICAR sponsored National Agricultural Higher Education Project
Centre for Advanced Agricultural Science and Technology (CAAST) on Genomics-Assisted Crop Improvement and Management
ICAR-Indian Agricultural Research Institute, New Delhi

Environment Management Framework

Environment Sustainability Plan

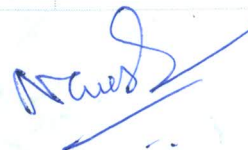


S. No	Proposed Interventions/ Activities	Compliances applicable	Possible Environmental Impacts	Mitigation Measures	Scope for the integration of environmental Sustainability concerns	Resources Required (budget, technical support etc.)
1.	Biochemical, molecular biology experiments	WHO Laboratory Safety Manual	Ethidium Bomide is a mutagen; Acrylamide is potential carcinogen;	Ethidium Bomide is disintegrated or absorbed in charcoal before disposal of EtBr solution; Charcoal is incinerated; Acrylamide is polymerized before disposal; Lab safety protocols will be followed First aid kits	Products/ varieties developed beyond project period enhance climate resilience, resource use efficiency, and reduce use of agro-chemicals. Future product development following the EPA 1986/rDNA Guidelines 1990 and GEAC approval. Good lab practices	Provision has been already made in the project
2.	Agricultural microbiology experiments	WHO Laboratory Safety Manual	No or low individual and community risk	All microbial cultures will be autoclaved and sterilized before disposal	GMT (good microbiological techniques) will be followed	Provision has been already made in the project
3.	Genomics of Plant Pathogens and artificial inoculation for screening of	WHO Laboratory Safety Manual	Environmental release is not proposed	1) Plant pathogens will be used in Lab and containment greenhouses;	Good laboratory practices	Provision has been already made in the project

[Handwritten signature]

[Handwritten signature]

[Handwritten signature]

	pathogen resistance in plants			2) All microbial cultures will be autoclaved and discarded		
4.	Genome editing in rice will be carried out for the purpose of functional genomics in containment facilities (Tissue culture lab & Transgenic Greenhouse)	EPA 1986/rDNA Guidelines 1990/Guidelines for Research in Transgenic crops 1998: Permission from "Institutional Biosafety Committee (IBSC)" & information to "Review Committee on Genetic Manipulation (RCGM)"	Environmental release is not proposed	1) All genome edited lines will be incinerated /burnt in the incineration pit. 2) All microbial cultures will be autoclaved and discarded	Rice genome edited mutants with enhanced stress tolerance/resource use efficiency/yield developed during the project period may be considered for future product development following the EPA 1986/rDNA Guidelines 1990 and GEAC approval.	Provision has been already made in the project
5.	Renovation of existing Labs	National building code of India, 2005	Piling of old debris; Possible use of low quality material ; Noise pollution; Over exploitation of water resources	All CPWD standards will be followed including labour safety and amenities; All old material waste will be disposed for land filling, etc., by CPWD Building safety; Proper Light and ventilation; Avoidance of Noise pollution; Avoiding wastage of water;	Proper lab design with ventilation, safety, space Atomizer sensor water taps, Fire safety equipments, waste segregation boxes, paper shredders with economic output, window reflectors, Water meters in labs CCTV Green Campus Certification	Additional budget requirement will be required Approx 20 lakhs






				Avoiding dust pollution		
6.	Bioinformatics lab E-waste management	E-waste management and handling rules, 2011	Piling of e-waste causing environmental pollution	E-waste will be collected , pooled, and sent to e-waste collection centre in Delhi	Following the best practices and disposal guidelines	Provision has been already made in the project
7.	All labs Energy efficient labs Safety	EA	Over use of energy	LED lights will be installed; Energy rated appliances will be used; UPS for power supply; Adequate earthing Solar panels (20 kv)	Enhanced resource use efficiency, environment protection. Attitudinal /behavioral changes	Additional budget requirement will be required Approx 25 lakhs
8.		EA		Quality drinking water to all staff working in the project by installing RO systems Waste disposal measures First-aid kits	Health safety measures	IARI will provide
10	Capacity building of faculty and students	ES	Environmental pollution/ wastage of resources	Awareness workshops to students/ faculty	Enhanced resource use efficiency, environment protection. Attitudinal /behavioral changes	-

Signature


Dr S. Nareh Kumar
(Nodal Officer)
ESP, CAAST and
Professor, CESCRA,
ICAR-IARI, New Delhi

Signature


Dr. C. Viswanathan
PI, CAAST and
HoD, Plant Physiology Division
ICAR-IARI, New Delhi

Signature


Dr Manjaiah
Nodal Officer
CAAST, ICAR-IARI

Signature


Dr AK Singh
Director
ICAR-IARI