

Environment Assessment and
Environment Management Framework
(EMF) for National Agricultural Higher
Education Project (NAHEP)

Draft Report

Volume I – Environmental Safeguards

Indian Council of Agricultural Research
(ICAR)



Executive Summary

About the project:

The purpose of the National Agriculture Higher Education Project (NAHEP) is to support participating Agricultural Universities (AUs) and ICAR in providing more relevant and higher quality education to agriculture university students. The project components are as follows:

1. Support to Agricultural Universities
 - a. *Sub-component 1a – Support to Institutional Development Plans of AUs*
 - b. *Sub-component 1b – Centers for Advanced Agriculture Science and Technology (CAAST)*
 - c. *Subcomponent 1c - ICAR innovation grants to AUs*
2. Component 2 – Investments in ICAR Leadership in Agriculture Higher Education
3. Component 3 – Project Management and Learning

Environmental safeguards:

The project is categorized as ‘Category B’ as per the environmental safeguard policy of the World Bank, as the interventions like ‘Institutional Development Plans that would update infrastructure for research and teaching’ (under sub-component 1a) may have negative impact on the surrounding environment. The interventions proposed under sub-components 1b and 1c ‘CAASTs’ and ‘innovation grants’ offers scope for enhancing the positive impacts on environment through integration of pro environmental measures.

Environmental Assessment study

As a safeguard requirement ICAR has conducted an Environment Assessment study and prepared an Environment Management Framework (EMF). An online survey is conducted targeting the faculty and students to understand the safeguards status and assessing the capacity of the universities for implementing safeguards. The key findings of the survey are:

- Relevance of the current curriculum to the local agro ecological problems, sustainable production systems and climate change resilience is moderate
- Shortage of faculty and lack of trainings are key barriers in delivering quality education
- AUs compliance with laboratory standards is medium

In addition to this desk reviews are conducted to understand the safeguard requirements for laboratories, constructions etc.

Environment Management Framework:

Based on the environment assessment an Environment Management Framework is prepared for the project. The purpose of Environment Management is to ‘ensure the environmental sustainability of the project interventions and to integrate the key environmental concerns in agriculture into education and research’.

The approach involves:

- Integration of Environmental Sustainability Plans (ESPs) into the Institutional Development Plans (sub-component 1a) and innovation grants proposals (sub-component 1c) – which will cover the safeguard requirements, key risks and mitigations.
- Integrating environmental sustainability concerns into CAASTs
- Suggestions for greening the agricultural curricula and associated research and extension

The EMF presents the ‘legal and regulatory framework’- a compilation of applicable acts, rules and regulations of GoI and identifies potential environmental risks and presents the

mitigation measures along with an exclusion list. The scope for integrating concerns of environmental sustainability is also discussed.

The EMF procedures involve:

1. Awareness generation on EMF through orientation programmes to SAUs
2. Preparation of Environmental Sustainability Plans (ESPs) as part of proposals - Institutional Development Plans, innovation grants by SAUs
3. Screening of the proposals for activities in exclusion list
4. Evaluation of ESPs by technical committee and approval with suggestions if any
5. Implementation of ESPs
6. Monitoring of ESP implementation

The responsibility of EMF implementation lies with the Education Division/ ICAR which facilitates the EMF implementation through capacity building, technical support and monitoring. A tentative budget estimated at 160 lakh is proposed for implementation of the EMF.

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Section I: Introduction

1.1. Background of the National Agricultural Higher Education Project (NAHEP)

The Indian Council of Agricultural Research (ICAR) carries the mandate for the coordination and quality assurance of Agricultural Higher Education at Agricultural Universities (AUs) in India. The ICAR-AU System comprises 61 State Agricultural Universities, five Research Institutes (known as Deemed Universities), four Central Agricultural Universities, and three Central Universities with agricultural faculty. ICAR has a mandate to ensure quality of agricultural higher education across the country. ICAR provides voluntary AU accreditation to establish norms and quality standards for agricultural higher education. ICAR continues its financial support to AUs for such accreditation. The agricultural universities modeled on land grant colleges and established in the early 1960s have made tremendous contribution in the initial decades. Their proliferation and fragmentation into thematic universities dented their capacity in many aspects. SAUs must adapt to the rapidly changing agricultural sector and its increasing knowledge intensity, and prepare the high-quality human resources essential for any technology and innovation system to succeed. Improving the quality and relevance of agricultural education requires a fundamental change of approach in governance and control, financial sustainability, accountability, autonomy, transparency and meritocracy. There is a strong justification for massive intervention through investments in agricultural education front to usher in reforms in the arena of education quality, commercialization and revenue generation and ICT application focusing on effective governance, quality assurance, excellence, transparency and linkages that would lead to increased access, equity and competitiveness in higher agricultural education.

Project Objective:

The proposed NAHEP would support participating Agricultural Universities and ICAR

in providing more relevant and higher quality education to agriculture university students.

NAHEP would target the 73 institutions that form the ICAR-AU System, consisting of State Agricultural Universities (61), Deemed Universities (5), Central Universities with Agricultural Faculty (4) and Central Agricultural Universities (3).

The Project has the following components:

2. **Component 1 – Support to Agricultural Universities (USD 146.4 million, of which USD IDA USD 73.2 million):** would finance investments by participating AUs to improve the quality and relevance of agricultural education and research for agricultural transformation. The component has three sub-components.

Sub-component 1a – Support to State-level AUs (USD 69.4 million, of which IDA USD 34.7 million) would target reform-ready State-level AUs (applying verifiable eligibility criteria as given in the

Project Implementation Plan) and support competitively selected and performance-based Institutional Development Plans (IDPs), financed through ICAR's existing

3. Development Grant window. The IDPs under this subcomponent seek to improve: (a) learning outcomes and future employment for AU students; and (b) faculty teaching performance and scientific effectiveness. Through the IDPs, the AUs would identify and prioritize key challenges, propose interventions to respond to these challenges, and set timelines and indicators for measuring achievement of greater quality and relevance attributable to these interventions. The IDPs would also leverage other funding sources (e.g., existing or additional state-level funds, private sector, foundations) along with ICAR's Development Grant. NAHEP would finance each IDP through a subproject grant directly to the participating AU. Activities financed under each IDP would include: (a) capacity building and training for agreed governance reforms that promote AU autonomy and accountability; (b) updated infrastructure (i.e., minor civil works, goods) for research and teaching; (c) faculty development (i.e., training, consultant services); (d) networking with industry and other learning institutions, both national and international; (e) increased vocational education through the launching of certificate programs; (f) more effective student job placement; and (g) own-revenue generation for AUs.

4. *Sub-component 1b – Centers for Advanced Agriculture Science and Technology – CAASTs (USD 46.2 million, of which IDA USD 23.1 million)* would support competitively selected IDPs proposed by AUs to establish multidisciplinary centers for teaching, research and extension on critical and emerging agricultural topics (e.g., globalization; climate change and resilience; land and water use efficiency; scalable technology; effective pedagogy and knowledge transfer; agro-industry; and agro-entrepreneurship). Multi-stakeholder consultations would inform the geographic locations and core themes for the proposed CAASTs, after which eligible AUs would compete for CAAST funding. Approved AUs would be financed through a CAAST subproject grant directly to the participating AU. The sub-component would finance: (a) research and teaching equipment (i.e., goods); (b) faculty and scientist development fellowships, (c) student scholarships, primarily at the postgraduate level; and (d) costs associated with twinning arrangements with similar centers (e.g., universities, research centers) both outside and within India (i.e., training, consultant services, and non-consultant services).

5. *Subcomponent 1c - ICAR innovation grants to AUs (USD 30.8 million, of which IDA USD 15.4 million)* – would be open to all AUs across the ICAR-AU System and primarily support technical assistance and consultant services required to make AUs eligible (i.e., reform ready) for participation in subcomponents 1a and 1b. The subcomponent would also finance theme-based, competitive grants to AUs that: (a) promote intra- and inter-state, international, inter-institutional and public-private collaboration; and (b) stimulate increased private sector linkages for faculty and students.

6. The Project Implementation Plan, satisfactory to the Bank, would include detailed guidelines for developing, evaluating and implementing IDPs (under subcomponent 1a), CAAST subprojects (under subcomponent 1b) and innovation grants (under subcomponent 1c), including financial support available under NAHEP, procedures for inviting, reviewing and ranking specific proposals, implementation and monitoring of approved grants.

7.

8. **Subproject Cycle – IDPs, CAASTs and Innovation Grants:**

- Following a dissemination campaign to create overall NAHEP awareness, interested and eligible AUs would define their institutional development goals and develop associated activities and outcomes (with technical assistance as required) into IDPs/ CAAST Proposals (or develop Innovation Grant proposals), which are submitted to the Education Division/ ICAR;
- IDPs/ CAAST Proposals (or Innovation Grants proposals) are evaluated by the Technical Committee for compliance with environmental, financial, institutional, social and technical guidelines (per the Project Implementation Plan);
- Subproject agreements are signed between AUs and the Education Division/ ICAR to support finance of approved IDPs/ CAASTs (or Innovation Grants) and specify the use of subproject resources, and the rights and responsibilities of AUs and the Education Division/ ICAR;
- The Education Division/ ICAR transfers subproject resources to AUs for IDP/ CAAST (or Innovation Grant) implementation;
- AUs contract goods, works, consultant services and non-consultant services, in accordance with the approved IDP/ CAAST (or Innovation Grant) the norms established in the Project Implementation Plan, and prepare reports (e.g., Financial Utilization Certificates) which they submit to the Education Division/ ICAR to document the use of subproject resources.

9. **Component 2 – Investments in ICAR Leadership in Agriculture Higher Education (USD 10.4 million, of which IDA USD 5.2 million)** – would finance ICAR’s internal reforms to enhance its effectiveness in: (a) coordinating, guiding and managing agricultural higher education across the ICAR-AU System; and (b) its interactions with AUs and key stakeholders nationwide through interventions that increase the quality and relevance of agricultural higher education.

10. As the Education Division/ ICAR is responsible for national coordination and quality assurance of agricultural higher education in the ICAR-AU System, the component would leverage ICAR’s comparative advantage in assessing systemic challenges across the ICAR-AU system and incubating solutions. The component would finance goods, training, consultant services and non-consultant services such as: (a) change management services to aid the Education Division/ ICAR in its reform agenda; (b) digital information systems for AU data collection and analysis to improve quality metrics in agricultural higher education; (c) an improved curricula review process to tighten its relevance in today’s dynamic job market through IDPs and CAASTs; (d) enhanced methods to consolidate and disseminate global best-practices in agricultural higher education (e.g., benchmarking); (e) institutionalization of stakeholder and advisory inputs to better inform research, education and extension across the ICAR-AU system; and (f) an External Advisory Panel, drawing on both national and international experience relevant to agricultural higher education, to provide a vehicle for best-practice dissemination and adoption by participating AUs.

Component 3 – Project Management and Learning (USD 8.2 million, of which IDA USD 4.1 million)

– would support NAHEP project management, primarily through the Education Division/ ICAR, to administer, supervise, monitor and evaluate overall project implementation. The component would support: (a) an NAHEP Steering Committee that would provide strategic guidance to the Education Division/ ICAR throughout project implementation;

11. (b) a Technical Committee, to evaluate IDP and Innovation Grant proposals; (c) a communication strategy to build awareness among AUs and other stakeholders regarding the objectives and activities of the proposed NAHEP; and (d) training and capacity-building for both ICAR and the AUs to achieve and sustain increased quality, relevance and effectiveness of agricultural higher education across the ICAR-AU system.

1.2. Types of Interventions and the need of Environment Management

The project is categorised as ‘Category B’ as the interventions like ‘updating infrastructure for research and teaching’ (under component 1a) may have negative impact on the surrounding environment. The interventions proposed under components 1b and 1c ‘CAASTs’ and ‘innovation grants’ offers scope for enhancing the positive impacts on environment through integration of pro environmental measures.

Given below is the snapshot of applicability of environment management to the project components, sub components:

Table 1: Scope of environment Management in the Project

Component	Sub component and Interventions	Impact on environment /scope for enhancement	EMF procedures to be put in place
Support to Agricultural Universities	Support to Institutional Development Plans which may propose for <ul style="list-style-type: none"> Updating infrastructure for research and teaching Faculty development (training and consultant services) 	<ul style="list-style-type: none"> Infrastructure related activities are likely to have negative impact on the environment Scope for due allocation of trainings on sustainable agriculture, climate resilience etc. 	<ul style="list-style-type: none"> Environment Criteria for Screening and evaluation of IDPs Environmental guidelines for infrastructure development Checklist of mandatory requirements in research facilities Suggestive list of trainings and capacity building programmes
	Centers for Advanced Agriculture Science and Technology (CAAST) <ul style="list-style-type: none"> Research and teaching equipment Faculty and scientist development fellowships 	<ul style="list-style-type: none"> Weightage for pro environmental themes and locating CAASTs in sensitive agro ecological 	<ul style="list-style-type: none"> Suggestive list of pro environmental themes and regions of ecological importance.

		regions	
	Innovation grants	<ul style="list-style-type: none"> Integrating parameters for environmental sustainability. 	<ul style="list-style-type: none"> Environment criteria for screening and evaluation of proposals for innovation grants to ensure sustainability
Investment in ICAR Leadership in Agricultural Higher Education	<ul style="list-style-type: none"> Improved curricula review process as test cases under IDPs and CAASTs contemplated courses 	<ul style="list-style-type: none"> Balanced integration of environmental sustainability concerns 	<ul style="list-style-type: none"> Suggestive list of themes for integration into curricula – through seminars, workshops
Project Management and Learning			<ul style="list-style-type: none"> EMF implementation plans and monitoring mechanisms.

1.3. Environment Management Framework for the project:

The purpose of Environment Management is to ‘ensure the environmental sustainability of the project interventions and to integrate the key environmental concerns in agriculture into education and research’.

The approach involves:

- Integration of Environmental Sustainability Plans (ESPs) (Annexure 2) into the IDPs and innovation grants proposals – which will cover the safeguard requirements, key risks and mitigations.
- Integrating environmental sustainability concerns into CAASTs
- Suggestions for greening the agricultural curricula and associated research and extension.

This volume (Volume I) of the EMF report focuses on safeguard compliance of the NAHEP interventions which will be ensured through ESPs. This EMF is a dynamic document which will be updated followed by the project launch to guide the environment management needs of IDPs and Innovations grants in a more focused manner.

1.4. Process of Developing EMF

The process of developing the EMF includes:

Desk review: Desk review of applicable acts, rules, regulations and laws of Government of India, EMFs developed for earlier projects like NAIP, guidelines and Codes of Practices (CoPs) pertaining to research laboratories, key environmental concerns in Indian agriculture, sustainable agriculture etc.

Stakeholder survey: An online survey was conducted covering faculty, scientists and students to understand the need and capacity for implementation of environment safeguards.

Consultations: The project was discussed during the annual VCs conferences during 2013 and 2015, institution-industry interface meeting held in June 2015, intensive interaction with the Agricultural Education Division, etc.

Disclosure: The report is being disclosed by hosting in the ICAR/project website for sufficient time to invite suggestions from stakeholders.

1.5 Structure of EMF Report:

Section 1, (this section) gives the background of the NAHEP, applicability of environment management, objectives of EMF and approach.

Section 2 discusses the capacity of agricultural universities (AUs) on safeguards compliance and needed measures.

Section 3 provides the requirement of safeguard compliance and lists out the legal and regulatory requirements as per the Government of India.

Section 4 discusses the potential adverse impacts of NAHEP interventions and proposes measures to mitigate such impact.

Section 5 describes the processes that should be in place for effective implementation of EMF.

Section 2: Baseline Survey of Agricultural Universities – Constraints Faced by State Agricultural Universities in Delivering Quality Agricultural Higher Education

ICAR with the support of World Bank conducted a baseline survey to assess the capacity of the State-level Agricultural Universities and Research Institutions within the ICAR-AU system for understanding their ability to comply with the World Bank safeguard policies.

Both Environment and Social questions are combined into one survey (20 questions in total) and there are 2 sets (links) - one for faculty and one for students. The survey link was provided for the participant in a communication addressed to all the Vice-chancellors/Directors with a request to identify on coordinator who will facilitate online responses from a minimum of 50 faculty and 100 students from the participating university/institution.

The survey covered environmental (relevance of the curricula to local agro ecological problems, student learning and field experience on climate change resilient agriculture, focus on sustainable agricultural production systems, constraints in delivering quality education, and in meeting the prescribed laboratory standards, emergency plan for safety, disposal of hazardous chemical and biological wastes, support required for quality education) and Social (quality of curriculum taught in relation to labor market demand, institutional capacity for globally competitive education, constraints in attracting high-quality students and female students, ability in complying with the laboratory standards, ability in complying with the employment demand by the industry, university's systems for mainstreaming students from vulnerable groups, issues faced by female faculty, support required for upgrading the facilities and conducting quality research) and social aspects posed in 20 questions with graded/multiple responses.

The survey response rate was fairly high: 54% for students and 47% for Faculty. The response ranged from 1115 to 4225 across the questions, may be because of the differences in the perception or relevance of the individual questions to the respondent.

Eighty per cent of faculty respondents belong to state or central agricultural universities. Four percent were holding managerial positions in education. Lack of human resources (35.82%), lack of expertise (29.65%), and shortage of fund (25.85%) were cited as the major constraints towards delivery of quality education by the faculty. While 40 % of the faculty felt the current curriculum relevant for local agricultural agro ecological problems, 51 % found the focus on student learning and associated field experience on climate change

resilient agriculture as moderate. The faculty response on the requirement regarding upgradation of facilities was almost equal among training, equipment, manpower and finance as in the order. One third of the female

faculty expressed lack of human resource development policy and opportunity for career enhancement as a major impediment for their progress. The existing opportunities for social inclusion and educational attainment were rated high. Training (33%), twinning arrangements (32%) and reforming curriculum (30%) were cited as major ways of overcoming human resources shortage. Twenty one percent of the faculty found the current curriculum as highly relevant to meet the labour market demand while sixty four percent found it moderately relevant. Lack of training, funds and facilities were cited as the major reasons for not meeting the laboratory standards by 26.78%, 22.97 % and 22.89 % faculty respectively.

Of those participated in the students' survey, 52.15 % were bachelors, followed by Masters (32.05%) and Ph.D scholars (15.80%). The response of the students on the relevance (26%) of the current curriculum for local agricultural agro ecological problems, and the focus on student learning and associated field experience on climate change resilient agriculture (51%) were similar to that of the faculty in kind though differed in magnitude. The students reported training opportunities (30.81%), modern equipment (28.04%) and additional manpower (23.24%) as the major requirements for quality educational experience. While 4.44 % of the students rated the existing agricultural higher education as excellent, 28.63% rated as very good and 39.82% as good. Only 5.78% rated as poor and the rest as moderate. Scope for jobs and assured employment was the reason attributed by twenty five per cent of the students for their choice of agricultural education as a pursuit. While 13.96% of the students found the relevance of the teaching quality to meet the labour market demand as high, 61.54% considered the same as moderate. Nearly 70 per cent of the students reported their job or employment prospects as more than good. The major constraint faced by students in accessing quality higher agricultural education was the lack of specialized knowledge intensity (23%) followed by lack of education, extension and training facilities, lack of credit/scholarships and poor infrastructure (18% each) and disconnect between curriculum and employment (16.75%). While 20.29% of female students reported no obstacles for participation in extension and training, 29.96% felt the attitudes and assumptions as male biased and 28.10% opined agricultural research priorities as male dominated. The major accessibility issues for rural students were lack information about courses (32.93%) and lack of scholarships/funding (24.58%). Collaboration with foreign universities and knowledge and skill intensive job driven courses can enhance enrolment in agricultural courses as reported by 21.88% and 22.46% students respectively.

The summary highlights of the survey results highlighted that the faculty emphasis were – a. human resource development – more manpower (recruitment) and better training; b. access to technology in the classroom; c. linkage with industry; and d. alignment of curricula with skills demanded in the marketplace and that of the students' were – a. experiential and practical learning opportunities; b. updated teaching techniques and c. learning relevant for future employment.

Section 3: Safeguard Compliance Requirements

3.2. Legal and Regulatory Framework:

3.2.1. Research and Education:

Table 2: Compliance Requirements Applicable to the Project Activities

S. No	Act, Policy or Government Order	Brief Overview	Applicability to NAHEP
<i>National Legislations</i>			
1.	Environment Protection Act (1986). “Rules for the manufacture, use/import/export and storage of hazardous microorganisms/genetically engineered organisms or cells, 1989”	<ul style="list-style-type: none"> • Certain experiments for the purpose of education within the field of gene technology or microorganism may be carried out outside the laboratories and laboratory areas mentioned in sub-rule (2) and will be looked after by the Institutional Biosafety Committee. • No person shall import, export, transport, manufacture, process, use or sell any hazardous microorganisms of genetically engineered organisms/substances or cells except with the approval of the Genetic Engineering Approval Committee. • Use of pathogenic microorganisms or any genetically engineered organisms or cells for the purpose of research shall only be allowed in laboratories or inside laboratory area notified by the Ministry of Environment and Forests. • Any person operating or using genetically engineered organisms/microorganisms mentioned in the schedule for scale up or pilot operations shall 	Applicable, as the P.G, Ph.D. research project may involve use of genetically engineered organisms.

		<p>have to obtain license issued by the Genetic Engineering Approval Committee for any such activity</p> <ul style="list-style-type: none"> • Deliberate or unintentional release of genetically engineered organisms/hazardous microorganisms or cells, including deliberate release for the purpose of experiment shall not be allowed without the special approval of GEAC 	
2	<p>Insecticides Act 1968</p> <p>An Act to regulate the import, manufacture, sale, transport, distribution and use of insecticides with a view to prevent risk to human beings or animals, and for matters connected therewith.</p>	<ul style="list-style-type: none"> • Any person desiring to stock or exhibit or distribute any insecticide or to undertake commercial pest control operations with the use of any insecticide may make an application to the licensing officer for the grant of a license. 	Not applicable if the universities, research institutes stock the insecticides for experimental purposes only.
3	<p>Hazardous Wastes (Management and Handling) Rules, 1989 and Amendment Rules, 2000 & 2003.</p>	<ul style="list-style-type: none"> • Every occupier handling hazardous wastes shall make an application to the Member-Secretary, State Pollution Control Board or Committee, as the case may be or any officer designated by the State Pollution Control Board or Committee for the grant of authorization • Occupier not having a hazardous wastes treatment and disposal facility of his own as the case may be, for a common Treatment, Storage and Disposal Facility (TSDF) shall become a member of this facility and send his waste to this facility to ensure proper treatment and disposal of hazardous wastes generated 	Partners to verify the applicability of the acts and ensure compliance.
4	The Seed Act,	<ul style="list-style-type: none"> • Selling, bartering or otherwise 	Applicable as some

	1966	<p>supplying any seed of any notified kind or variety, requires that –</p> <ol style="list-style-type: none"> a) Such seed is identifiable as to its kind or variety b) Such seed conforms to the minimum limits of germination and purity specified c) The container of such seed bears in the prescribed manner, the mark or Label containing the correct particulars. <p>To provide for regulating the quality of certain seeds for sale, and for related matter</p>	State-level AUs supply seed material to farmers.
5	National Biodiversity Act, 2002	<ul style="list-style-type: none"> • Any person who intends to obtain any biological resource occurring in India or knowledge associated thereto for research or for commercial utilization or for bio-survey and bio-utilization or transfer the results of any research relating to biological resources occurring in, or obtained from, India, shall make application in such form and payment of such fees as may be prescribed, to the National Biodiversity Authority. • Any person who intends to transfer any biological resource or knowledge associated thereto referred to in sub-section shall make an application in such form and in such manner as may be prescribed to the National Biodiversity Authority. • The National Biodiversity Authority shall, subject to any regulations made in this behalf, determine the benefit sharing which shall be given effect in all or any of the following manner, namely: transfer of technology, or association of Indian scientists, benefit claimers and the local people with research and development in biological 	<p>Applicable as the students' research may involve obtaining biological resources or associated knowledge.</p> <p>Applicable as partnerships with foreign universities may involve sharing of knowledge related to biological resources of the country.</p>

		resources and bio-survey and bio-utilization;	
<i>Guidelines and Codes of Practices</i>			
6	Recombinant DNA guidelines, 1990	<ul style="list-style-type: none"> The guidelines cover areas of research involving genetically engineered organism. It also deals with genetic transformation of green plants, rDNA technology in vaccine development and on large scale production and deliberate/accidental release of organisms, plants, animals and products derived by rDNA technology into the environment. <p>The levels of risk and classification of the organisms within these categories have been defined in these guidelines. Appropriate practices, equipment and facilities necessary for safeguards in handling organisms, plants and animals in various risk groups have been recommended. The guidelines employ the concept of physical and biological containment and the principle of good laboratory practices.</p>	Applicable. Any proposals by SAUs that may involve research concerning genetically engineered organisms should be informed by the rDNA guidelines and a compliance statement should be given as part of ESP (detailed on section 4).
7	Guidelines for research in transgenic crops, 1998	<p>In 1998, DBT brought out separate guidelines for carrying out research in transgenic plants called the Revised Guidelines for Research in Transgenic Plants. These also include the guidelines for toxicity and allergenicity of transgenic seeds, plants and plant parts.</p> <p>These guidelines cover areas of recombinant DNA research on plants including the development of transgenic plants and their growth in soil for molecular and field evaluation. The guidelines also deal with import and shipment of genetically modified plants of research purposes.</p>	do
8	WHO laboratory safety manual – incorporated into R DNA guidelines	<p>The 3rd edition of the manual focuses on risk assessment, safe use of recombinant DNA technology and transport of infectious materials. It also introduces bio security concepts – the protection of microbiological assets from theft, loss or diversion,</p>	do

		which could lead to the inappropriate use of these agents to cause public health harm.	
9	NABL guidelines for residue analysis labs	It supplements ISO/ IEC 17025: 2005 standard and provides specific guidance on the accreditation of chemical laboratories for both assessors and laboratories preparing for accreditation. It gives detailed guidance for those undertaking quantitative and qualitative examination of the composition, nature and properties of materials, products and substances. The requirements for accreditation are laid down in the International Standard ISO/IEC 17025: 2005 (General requirements for the competence of calibration and testing laboratories).	Applicable to up gradation of laboratories concerned with food testing, pesticide residue analysis etc.

3.2.1. Civil Works:

Table 3: Compliance Requirements Applicable to the Civil Works

S. No	Act, Policy or Government Order	Brief Overview	Applicability to NAHEP
<i>National Legislations</i>			
1	Preservation of Trees Acts	<ul style="list-style-type: none"> Permissions are required to clear trees. State specific acts with regard to this speak about the provisions. 	Applicable as site clearance for construction may involve cutting of trees
2	Ground water Acts	<ul style="list-style-type: none"> Permission required to drill bore wells, water quality tests, recharge, rainwater harvest etc. 	
4	National Building Code of India 2005	<ul style="list-style-type: none"> The code provides regulations for building construction by departments, municipal administrations and public bodies. It lays down a set of minimum provisions to protect the safety of the public with regard to structural sufficiency, fire hazards and health aspects. 	Applicable.
5	Energy Conservation	<ul style="list-style-type: none"> ECBC sets minimum energy standards for commercial 	Applicable to air conditioned

	Building Code (Energy Conservation Act 2001)	buildings having a connected load of 100kW or contract demand of 120 KVA and above. While the Central Government has powers under the EC Act 2001, the state governments have the flexibility to modify the code to suit local or regional needs and notify them.	commercial buildings with connected load more than 100 kW.
6	The Noise Pollution (Regulation And Control) Rules 2000). To regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise.	<ul style="list-style-type: none"> • Sound emitting construction equipment shall not be used or operated during night times in residential areas and silence zones (hospitals and educational institutions). 	Applicable
7	e-waste (management and Handling) Rules, 2011	Consumers or Bulk consumers of electrical and electronic Schedule I shall ensure that e-waste generated by them is channelized to the authorised collection centre(s), or registered dismantler(s) or recycler(s) or is returned to the pick up or take back service provided by the producers; and Bulk consumers shall maintain record of e-waste generated by them in the Form 2 and make such record available for scrutiny by the State Pollution Control Board or the Pollution Control Committee concerned.	Applicable as electronic equipment will be purchased.

Section 4: Environmental Impacts of Project Interventions and Mitigation Measures

This section discusses the environmental impacts of the project interventions and suggests mitigation measures.

4.1. Component 1: Support to Agricultural Universities

4.1.1. Component 1a: Support to Agricultural Universities:

The AUs receive financial support for their Institutional Development Plans (IDPs) which may involve the following activities.

4.1.1.1. Updating Infrastructure for Research and Teaching

This will involve minor civil works; laboratory equipment etc. Up to 60% of the IDP fund is likely to be used for updating infrastructure and equipment. The type of infrastructure created/upgraded will include laboratories. Building construction will have direct and indirect impacts on environment during construction, maintenance etc. It is important to ensure that the surrounding environment is not compromised during the process.

The table below presents the possible impacts on environment and mitigation measures.

Table 4: Environmental Impacts and Measures for Civil works:

<i>Activity</i>	<i>Environmental Impacts</i>	<i>Mitigation Measures</i>
Site clearing	<ul style="list-style-type: none"> Site clearing sometimes leads to loss of greenery by felling trees, clearing vegetation etc. 	<ul style="list-style-type: none"> In cases where cutting of trees is required, permission should be taken from officers concerned. Compensatory plantation of trees of local species should be done in equal or more number near the same site or suitable alternate site In case of tree felling in forest or tribal areas, permission from Forest Department should be obtained by applying to Range Officer (in any case the felling must not involve more than 75 trees per ha – proportionate to the area).
Raw materials for construction	<ul style="list-style-type: none"> Possibility of use of illegally mined or low quality materials affecting the sustainability of environment and the infrastructure. 	<ul style="list-style-type: none"> All raw materials should be sourced from authentic and approved vendors, possessing valid permits. Relevant supporting documents should be presented for scrutiny on request.

<p>Building Design (research facilities)</p> <p>Ventilation, water harvesting etc.</p> <p>Safety measures</p> <p>Disaster proof construction</p>	<ul style="list-style-type: none"> • Lack of solar passive features demands high energy requirement for artificial lighting and air circulation. • Use of non renewable energy contributes to emissions • Lack of water source in the premises or over exploited source may lead to pressure on water resources and may involve transportation cost. • Risk due to lack of safety measures • Absence of disaster proofing makes the buildings vulnerable to disaster 	<ul style="list-style-type: none"> • Building design should be solar passive and should incorporate the proper ventilation requirements like sufficient number of ventilators, windows. • Possibility of solar electrification (at least partly) should be explored • Every building should be equipped with rain water harvesting structure which can meet the water requirement of the facility at least for non-drinking purposes. • All buildings should be equipped with fire safety equipment • Constructions in seismic zones, flood prone areas should have integration disaster proof features in consultation with PWD/relevant authority.
<p>Construction operations</p>	<ul style="list-style-type: none"> • The construction equipment operation may cause inconvenience to the workers and by passers due to dust, noise etc. • Inconvenience and health issues to the workers involved • Possibility of involvement of child labour. • Possibility of chance finds of archeological importance. • Land acquisition 	<ul style="list-style-type: none"> • Operations like mixing raw materials should be done in areas where people's movement is less and workers should use masks. • Construction equipment that emits noise should not be used in residential areas during night or near schools and hospitals. • The workers should be provided with gloves, masks, helmets etc. • Use of child labour should be avoided. • Any chance finds should be deposited with District Collector • The project does not fund for any land acquisition <i>(It is important to integrate relevant clauses into the civil works contracts)</i>
<p>Disposal of debris</p>	<ul style="list-style-type: none"> • Open disposal of 	<ul style="list-style-type: none"> • Debris should be put to alternate use

	construction debris near the site	such as land filling in consultation with municipal corporations.
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Environment Friendly Designs and Green Building Certifications

Environment Friendly Designs:

Apart from following the legal and regulatory framework and mitigating any negative impacts, the scope of EMF can be extended to integration of environment friendly features into the building designs depending on the feasibility. Integrating the environment friendly features will provide aesthetic value and conducive environment to work besides reducing the use of energy. Environment friendly parameters such as use of eco friendly construction materials (eg: mud bricks, bamboo, stone etc.) traditional architecture, roof top solar SPV, landscaping and improving greenery in the premises.

Green Building Certification:

Buildings have direct and indirect impacts on environment during construction and post construction. During construction, renovation, demolition and occupancy, the buildings use raw materials, energy, water and generates wastes and lead to harmful emissions.

As an effort towards sustainable design and maintenance ‘Green Building Rating System’ is introduced which aims to

- reduce the environmental impact of construction of new buildings by promoting resource conservation
- reduce the use of resources during operation and maintenance.

The following are the criteria for rating a building as ‘Green Building¹’:

- Proper site planning
- Building envelope design
- Building system design for Heating Ventilation and Air Condition (HVAC)
- Integration of renewable energy sources to generate energy onsite
- Selection of ecologically sustainable materials with low emission potential
- Indoor thermal and visual comfort and air quality leading to less energy consumption
- Water harvesting and efficient water management
- Low operation and maintenance costs
- Proper access to community infrastructure systems

The following are the agencies that support for rating the ‘Green Buildings’:

- **LEED India (Leadership in Energy and Environmental Design) Rating System by Indian Green Building Council (IGBC):** Indian Green Building Council (IGBC) is formed by the Confederation of Indian Industry (CII). IGBC facilitates green buildings in India through ‘IGBC Green New Buildings’ rating system. This rating tool enables the designer to apply green concepts and reduce environmental impacts which are measurable. The rating programme covers diverse climatic zones and changing lifestyles.

IGBC has licensed the LEED Green Building Standard from the US Green Building Council (USGBC). LEED certification provides independent verification of a building

¹ Green Buildings are Energy Efficient, Sourced at <http://www.indiaenvironmentportal.org.in/files/file/green%20building.pdf> accessed on 22nd February 2016.

or neighborhood's green features, including the design, construction, operations and maintenance of resource-efficient, high-performing, healthy, cost-effective buildings.

Contact address:

CII - Sohrabji Godrej Green Business Centre

Survey No 64, Kothaguda Post

Near Kothaguda Cross Roads

Ranga Reddy Dist

Hyderabad - 500 084

Tel: 040 - 44185111

Fax: 040 - 44185189

Email: igbc@cii.in

- **Green Rating of Integrated Habitat Assessment (GRIHA):**

GRIHA is a rating tool that helps people assess the performance of their building against certain nationally acceptable benchmarks. It evaluates the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a 'green building'. The rating system, based on accepted energy and environmental principles, will seek to strike a balance between the established practices and emerging concepts, both national and international. The system will help to 'design and evaluate' new buildings (buildings that are still at the inception stages). A building is assessed based on its predicted performance over its entire life cycle – inception through operation.

The stages of the life cycle that have been identified for evaluation are:

- Pre-construction stage: (intra- and inter-site issues like proximity to public transport, type of soil, kind of land, where the property is located, the flora and fauna on the land before construction activity starts, the natural landscape and land features).
 - Building planning and construction stages: (issues of resource conservation and reduction in resource demand, resource utilization efficiency, resource recovery and reuse, and provisions for occupant health and well-being). The prime resources that are considered in this section are land, water, energy, air, and green cover.
 - Building operation and maintenance stage: (issues of operation and maintenance of building systems and processes, monitoring and recording of energy consumption, and occupant health and well-being, and also issues that affect the global and local environment).
- **Small Versatile Affordable GRIHA (SVAGRIHA):** SVAGRIHA is part of Green Rating for Integrated Habitat Assessment (GRIHA Council). GRIHA is India's own rating system jointly developed by The Energy Research Institute (TERI) and the Ministry of New and Renewable Energy (MNRE), Government of India. SVAGRIHA has been designed as an extension of GRIHA and has been specifically developed for projects with built-up area less than 2500 sq. mtr which could be followed for the project given the size of the treasury offices. In this system buildings are rated in a three-tier process. The process initiates with the online submission of documents as per the prescribed criteria followed by on site visit and evaluation of the building by a team of professionals and experts from GRIHA Secretariat. GRIHA rating system consists of 34 criteria categorized in four different sections – Site selection and site

planning, Conservation and efficient utilization of resources, Building operation and maintenance, and Innovation.

Contact address:

The Energy Resources Institute (TERI)
 GRIHA, SVAGRIHA
 First floor, A 260,
 Bhisham Pitamah Marg,
 Defence Colony,
 New Delhi 110024
 Tel. - (+91 11) 46444500/24339606-08
 Helpline no. - (+91 11) - 40589139
 Website: <http://www.grihaindia.org/>

- **Bureau of Energy Efficiency (BEE):** BEE has developed a rating system for the buildings based on a 1 to 5 star scale. More stars mean more energy efficiency. BEE rating system considers the Energy Performance Index (EPI). The unit of Kilo watt hours per square meter per year is considered for rating the building and especially targets air conditioned and non-air conditioned office buildings. The Energy Conservation Building Code (ECBC) is taken into consideration under the rating system.

Contact address:

Bureau of Energy Efficiency

Ministry of Power,
 Govt. of India
 4th Floor, Sewa Bhawan
 R. K. Puram, New Delhi - 110066
Fax: +91 11 26178352
Email: admin@beenet.in
 Website: <https://beeindia.gov.in>

Eco-friendly designing does not necessarily require any extra costs but may rather reduce the cost of construction. However at times the green building processes and certification may lead to an increase in the overall cost of construction, however, the operational costs are reduced in long run besides the environmental benefits and conducive work atmosphere.

ICAR will aim to get all buildings certified as green buildings, including laboratories and will commission a report on green buildings and laboratories.

Table 5: Environmental Impacts and Measures for up gradation of Laboratories:

<i>Activity</i>	<i>Environmental Impacts</i>	<i>Mitigation Measures</i>
Building designs and construction	<ul style="list-style-type: none"> • Dearth of space, poor ventilation and illumination, lack of basic facilities may lead to uncomfortable working conditions 	<ul style="list-style-type: none"> • The laboratories should have sufficient space, ventilation, lighting, regular supply of essentials like quality water. Stack rooms, store rooms etc. should be spacious and well ventilated
Electricity supply and safety.	<ul style="list-style-type: none"> • Irregular supply of and fluctuations in electricity may hazard 	<ul style="list-style-type: none"> • Regular and stabilized electricity supply (220-230 volts) preferably green and captive should be ensured.

	quality and safety.	<ul style="list-style-type: none"> • Provision of standby source for power supply to sensitive and costly equipment. • Ground all sources of power supply for human and equipment safety.
Safeguards	<ul style="list-style-type: none"> • Lack of safeguards poses risk of exposure to harmful chemicals and accidents 	<ul style="list-style-type: none"> • An efficient hood system is necessarily required at laboratories in order to remove various toxic and hazardous fumes from the work place generated during use of organic solvent/or during acid digestion • The top surface of working bench should be made of acid and alkali resistant materials • All the laboratories should be equipped with fire fighting facilities, first aid kit, look into the feasibility for provision of eye wash fountains, safety showers etc. There should be adequate number of exit doors in case of emergency. • Fire safety instructions should be displayed in the form of posters in the wall and all the students, technicians, housekeeping staff should be oriented on immediate response to accidental burns, acid spills, fire etc. • All the hazardous substances should be labeled with precautions for the user.
Waste disposal	<ul style="list-style-type: none"> • Open disposal hazardous of laboratory wastes into gutters may contaminate the soil, groundwater etc. 	<ul style="list-style-type: none"> • The labs should have provisions for safe disposal of hazardous wastes • There should be a plan for separate collection of hazardous wastes which should be properly treated or disposed

4.1.1.2. Faculty Development (training, consultant services):

The faculty development programmes proposed should have balanced integration of environmental themes such as:

- Laboratory safety
- Biosafety
- Waste disposal
- Green energy and buildings for laboratories

- Biodiversity conservation
- Food safety

This list is only an indicative and more areas shall be identified once the environmental consultancy under the project is in place.

4.1.1.3. Improved Practical Education through KVKs and Vocational Education through Certificate Programs:

Practical education programmes should have due integration of pro environmental themes, non-invasive techniques, sustainable options, green and efficient energy use, waste recycling, water harvesting, more crop per drop, promotion of soil health, integrated pest management, organic agriculture, integrated farming system, etc. The programme will identify more such themes relevant to the local agro ecosystems and resource base.

4.1.2. Component 1b: Centers for Advanced Agriculture Science and Technology:

The component would support establishing multi disciplinary centers for teaching, research and extension on critical and emerging themes in agriculture. The themes and geographical locations would be identified through multi stakeholder consultations. EMF suggests a list of themes and locations which will become a part of base document for consultations.

The themes would focus on - bringing in water efficiency measures, sustainable land use and land management practices; a special focus on land based and environment/biodiversity friendly measures for productivity enhancement in forestlands where titles have been transferred to communities/individuals through the FRA etc.

4.1.3. Component 1c: ICAR Innovation grants to AUs:

Innovation grants are theme based competitive grants to AUs, Colleges and Departments, faculty and students to promote inter-state, international, inter-institutional and public-private collaboration. , including matching funds from the private sector; and needs-based equipment, training and technical assistance.

EMF suggests evaluation criteria for innovation grants:

- No activities in the exclusion list are part of innovation grants. Exclusion list attached Annexure 1.
- Activity should not have any negative impact on surrounding environment – land, water, biodiversity, etc.
- Sustainability concerns integrated into the education, research activity proposed
- Ability of the project to deliver some knowledge on environmental sustainability- limited, medium, high
- Stimulates the scientific creativity, research capacity on issues of environmental importance
- Agreements in place on safeguards measures with private partners who join the project and beyond either through PPP or as bilateral partners in research, teaching, marketing and/or construction etc.

4.2. Component 2: Investments in ICAR Leadership in Agricultural Higher Education

This component would finance improved curricula review process.

The curriculum review process should consider the requisite knowledge and skills for facing the challenges of food security, degrading environment, climate change etc. In addition to the curricula review theme based modular workshops could be conducted for PG and PhD students.

Research should be encouraged on these specific themes.

- Low green house gas agriculture
- Carbon credits for sustainable farming systems

Section 5: EMF Implementation Plan

This section presents the EMF implementation plan – which includes Environmental Evaluation of subproject proposals (IDPs, CAASTs and Innovation grants), Capacity Building and Monitoring requirements. A tentative budget and time plan is also included.

5.1. Integrating Environmental Sustainability Plans (ESPs) into the IDPs and Innovation Grants Proposals:

The sub project proposals (IDPs, CAASTs and Innovation Grants Proposals) will include an ESP which will identify the mandatory requirements, risks and mitigation measures. This will be prepared by the Environment Specialist at the participating AU and annexed to the proposal.

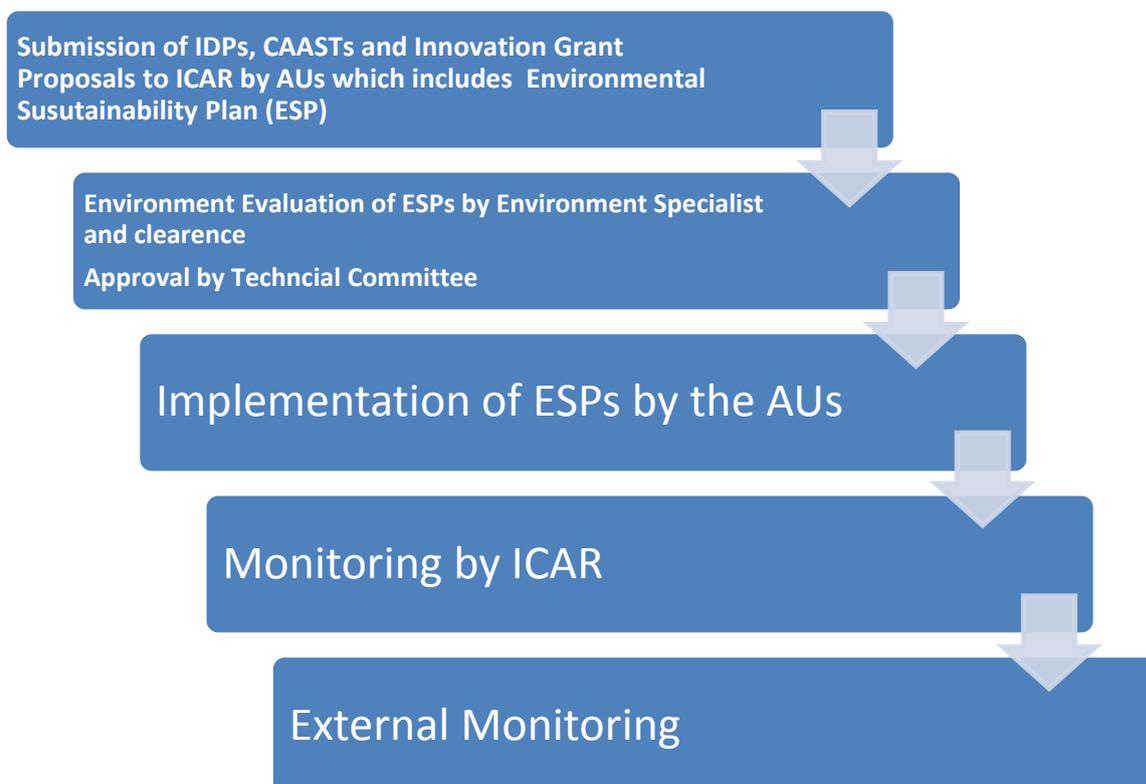
5.2. Environmental Evaluation IDPS and Innovation Grants:

In order to ensure the environmental sustainability of the ‘Institution Development Plans (IDPs)’, CAASTs and ‘innovation grants’ the proposals will be evaluated. This process will be termed as “Environmental Evaluation (EE)” of the plans/proposals. The process of environmental appraisal is done in 2 steps:

Step 1: screening the proposals for inclusion of any activities that are in the exclusion list.

Step 2: evaluation of the proposals (specifically Environmental Sustainability Plan) for due integration of mitigation measures for identified risks.

The process of environmental evaluation is detailed below:



5.2. Institutional Arrangements for EMF Implementation:

For successful implementation of EMF institutional arrangements are the key. The following are the proposed institutional arrangements



5.3. Capacity Building Arrangements:

EMF orientation to Environment Specialists at AUs:

A main orientation programme will be conducted for the Environment Specialists at AUs to orient them on the context and importance of EMF, preparation of ESPs, implementation, monitoring, documentation etc. This will be coordinated by an Environment Specialist at the Education Division/ ICAR.

Refresher trainings:

As part of review meetings or as spare sessions refresher training will be conducted once in 6 months or at stipulated intervals to keep them abreast with the key issues, best practices etc.

5.4. Monitoring:

Internal Monitoring:

As part of regular monitoring visits the Education Division/ ICAR – Environment Specialist will review the ESP implementation and prepares implementation status reports. Any key identified constraints will be resolved by providing required hand holding support.

External Monitoring:

An external agency will be hired to conduct an evaluation during 2nd – 3rd year of implementation with a purpose to understand the effectiveness of EMF, constraints etc, and to offer recommendations.

5.5. Budget:

The tentative budget for the EMF implementation is as follows:

Table 6: Budget estimate for implementation of EMF

Item	Unit cost (INR)	Total cost (INR)	Timeline
Hiring environment specialist at the Education Division/ ICAR	Rs. 75000/- per month for 60 months	Rs. 52 lakhs (reckoning 10% increase every year)	Within 2 months after the project launch
Capacity Building Programmes to Environment Specialist at participating AUs. Orientation and Refresher trainings	Rs. 5 lakh per programme	Rs.50,00,000/- for 10 programmes	6 th month after project launch; Subsequently twice / year
Monitoring visits to participating AUs	Rs. 20000/- per visit	Rs.40,00,000/- for 20 visits	Once every 6 months
External evaluation	Rs.10,00,000/- per evaluation	Rs.20,00,000/- for two evaluations	During 2 nd or 3 rd year of the project.

Annexure 1: Exclusion list

- Pesticides classified as class 1a, 1b and II are not permitted under any project interventions
- Partnership with foreign universities/private firms will not involve exchange of any bio resources (genetic material) without due notice to and permissions from National Biodiversity Authority
- Research with genetically engineered organisms is not permitted without approval of GEAC
- For construction works, no trees should be cut without permission from relevant departments
- No bore wells should be drilled without permissions
- No child labour should be hired for any construction activities

Annexure 2: Template for preparation of Environmental Sustainability Plans (ESPs).

Proposed intervention /activity	Possible Environmental Impacts	Mitigation Measures	Scope for integration of environmental sustainability concerns	Resource required (budget, technical support etc.)

Signature of Environment Specialist AU:

Date:

Signature of Environment Specialist PMU (ICAR):

Date:

