Higher Education Development Program (HEDP)

ENVIRONMENTAL AND SOCIAL MANAGEMENT FRAMEWORK (ESMF)

April 23, 2019

Higher Education Commission,
Government of Pakistan

Abbreviations

ACs	*Affiliated Colleges*
AUs	*Affiliating Universities*
CC	*Community College*
DAIs	*Degree Awarding Institutes*
E	*East*
EA	*Environmental Assessment*
EIA	*Environmental Impact Assessment*
ESMF	*Environmental and Social Management Framework*
ESMP	*Environmental and Social Management Plan*
GCF	*Grand Challenge Fund*
GDP	*Gross Domestic Product*
HDI	*Human Development Index*
HE	*Higher Education*
HEC	*Higher Education Commission (of Pakistan)*
HEDP	*Higher Education Development Program*
HEIs	*Higher Education Institutions*
HEMIS	*Higher Education Management Information System*
HR	*Human Resource*
HRD	*Human Resource Development*
ICT	*Information and Communication Technology*
IEE	*Initial Environmental Examination*
ISF	*Innovator Seed Fund*
IUCN	*International Union for Conservation of Nature*
IT	*Information Technology*
km	*Kilometers*
LI	*Learning and Innovations*
LMS	*Learning Management System*
mm	*Millimeter*
M&E	*Monitoring and Evaluation*
N	*North*
NAHE	*National Academy of Higher Education*
NEQs	*National Environmental Quality Standards*
OH&S	*Occupational Health and Safety*
OP	*Operational Policy*
ORIC	*Office of Research, Innovation and Commercialization*
PERN	*Pakistan Education & Research Network*
pH	*Power of Hydrogen Ion Concentration*
PCR	*Physical Cultural Resources*
PID	*Program Information Document*
PCU	*Project Coordination Unit*

PMD	*Pakistan Meteorological Department*
POPs	*Persistent Organic Pollutants*
QAA	*Quality Assurance Agency*
QEC	*Quality Enhancement Cell*
R&D	*Research and Development*
RE	*Resident Engineer*
S	*South*
SC	*Supervision Consultant*
TDF	*Technology Development Fund*
TNA	*Training Needs Assessment*
TPV	*Third Party Validation*
W	*West*
WB	*World Bank*
WESC	*Works, Environment and Social Safeguard Committees*
WWF	*World Wide Fund for Nature*
yr	*Year*

Executive Summary

In Pakistan, tertiary education refers to post-secondary education and is comprised of two distinct subsectors: Universities/degree awarding institutes (DAIs) and affiliated colleges (ACs). Both subsectors are comprised of public and private institutions with public institutions holding a slightly larger share of the sector and Higher Education Commission of Pakistan (HEC) predicts that this will continue to be the case. Universities are regulated by the federal HEC whereas ACs are under dual management. For administrative matters, they are under the control of their respective provincial higher education departments whereas for academic matters they are under the authority of their affiliating universities. ACs are funded by the provincial governments but their tertiary level degrees are awarded by the affiliating universities (AUs). ACs offer upper secondary grades (11 and 12) alongside tertiary level programs and serve as a transition between the two.

After decades of neglect, Pakistan's tertiary education sector has seen a revival with the establishment of HEC in 2002 which was granted more funding and autonomy as compared to the previous institution. HEC introduced initiatives to improve quality and instill a culture of research. It closed low quality programs and controlled the mushrooming of substandard higher education institutions. Despite making considerable headway towards addressing the challenges facing the tertiary education system much remains to be accomplished, especially in the multi-layered governance of the sector.

The four major challenges in the way of meeting the priorities identified in the 11th Five Year Plan and the HEC's ambitious Vision 2025 development strategy are: (a) low and inequitable participation in tertiary education; (b) poor quality of teaching and research conditions (including inadequate and irrelevant research, and limited links between Higher Education Institutions (HEIs) and the industrial and service sectors of the economy); (c) insufficient funding; and (d) below-par institutional governance and management, especially lack of the Higher Education Management Information System (HEMIS), which severely complicates long-term sectoral and institutional planning, monitoring, and accountability. These challenges are particularly exacerbated for affiliated colleges.[1]

To overcome these challenges, the HEC Pakistan plans to obtain the World Bank's technical support and financing.

The Project

The proposed World Bank support entitled "Higher Education Development Program (HEDP)" aims to support Government of Pakistan in strengthening the tertiary education system in the country. The proposed objective(s) of the Project is to support research excellence in strategic sectors of the economy, improve teaching and learning and strengthen governance, in the higher education sector.

[1] World Bank Program Information Document (PID)

Project Components

The five major components of the Project are as under:

Component 1. Nurturing academic excellence in strategic sectors
Sub-component 1.1: Promoting Innovative and Relevant Research
Sub-component 1.2: Encouraging Entrepreneurship and Self-employment
Sub-component 1.3: Local Challenge Funds

Component 2: Supporting Decentralized Higher Education Institutes for improved teaching and learning
Sub-component 2.1: Strengthening the Affiliation System
Sub-component 2.2: Bringing Education in Affiliated Colleges at par with International Standards
Sub-component 2.3: Improving the relevance of ACs to support the local socio-economic landscape
Sub-component 2.4: Connecting Affiliated Colleges to Pakistan Education and Research Network (PERN)

Component 3: Equipping students and higher education institutions with modern technology
Subcomponent 3.1: Improving the policy environment for ICT use
Subcomponent 3.2: Enhancing PERN Activities
Subcomponent 3.3: Expanding PERN vertically

Component 4: **Higher Education Management Information System and Data Driven Services**
Subcomponent 4.1: HEC Data Repository
Subcomponent 4.2: Digitization of University Administration

Component 5: Capacity Building, Project Management, Monitoring and Evaluation

Environmental and Social Management Framework

In compliance with Environment Assessment OP4.01 triggered by the Project, inter alia, Environmental and Social Management Framework (ESMF) is required for the World Bank financed projects to ensure compliance of environmental and social safeguard requirements of the national laws and World Bank's safeguard policies for those project activities that are not defined and/or whose locations are unknown at the time the Bank appraises the project.

This ESMF has been prepared using primary and secondary information collected through literature review, reconnaissance survey and stakeholder consultation workshop. This framework will be followed once specific projects activities are identified and their details are available. This framework also discusses the stakeholder engagement and involvement throughout the project life cycle and mechanism to disclose project information to them and redress the grievances of the affected community.

Environmental and Social Baseline: Environmental Challenges relevant to the Project's Strategic Sectors

The cost of environmental degradation in Pakistan is Rs. 365 billion per year or 6 percent of the GDP, mainly due to (i) illness and premature mortality caused by air pollution (indoor and outdoor), (almost 50 percent of the total damage cost); (ii) diarrheal diseases and typhoid due to inadequate water supply, sanitation and hygiene (about 30 percent of the total), and (iii) reduced agricultural productivity due to soil degradation (about 20 percent of the total). In the physical domain, the major threat is posed by climate change, associated with increased frequency and intensity of floods and hurricanes, prolonged droughts and growing water stress, shift of disease vectors, and the frightening possibility of the melting of the Himalayan icecaps.

In Pakistan, primary energy sources are mainly thermal (64%), hydropower (27%), nuclear power (7%) and renewable energy (2%). Share of hydro in electricity generation has decreased over the last five years, mainly due to lower availability of water. Thermal sources of energy pose serious threat to environment. Presently the share of renewable sources to energy supply in Pakistan is only 2% but future prospects of renewable energy are encouraging in Pakistan with a total potential of about 167.7 GW which is more than enough to meet the total electricity demand of the country.

Pakistan's agriculture sector plays a central role in the economy. Agricultural performance in Pakistan has been poor in recent years with slow growth (3.3% over the last decade). Major factors underlying this poor performance include a slow rate of technological innovation, limited adoption of progressive farming techniques, problems with quality, quantity and timeliness of input supply, limited investment in construction and maintenance of infrastructure; marketing and trade restrictions, pest and livestock disease problems, and limited amounts of credit for agricultural production and processing and the lack of agriculture-specific financing. Agriculture related environmental challenges include excessive withdrawal of scarce freshwater resources, waterlogging and salinity, soil erosion and desertification, disintegration of agro-ecosystem with excessive use of chemicals and pesticides, human health ailments due to excessive use of hazardous chemical pesticides, GHG emissions and rangelands degradation.

The country depends much on Indus Basin canal irrigation system, which is posed to serious operational, and maintenance issues. Huge water losses in transit through leakages, illegal pumping and inefficiency of the system adversely affect the small landholders and those at the tails of the distribution channels. The recurrence of droughts in certain areas and floods in recent years has further increased the number of food insecure people. These issues have reduced water use efficiency at farm level a major reason of low average yields of crops at national level. The irrigation water availability for 2016-17 has been assessed at 132.7 MAF against the targeted 134.56 MAF. Rain fall during early Rabi season remained low causing water shortages, affecting especially wheat sowing in rain fed areas. With an estimated population of 227 million by 2025, Pakistan's current water availability of less than 1100 cubic meters per person, down from

5000 cubic meters in 1951 classifies it as a “water-stressed” country that is headed towards becoming a “water-scarce” country if actions are not taken urgently.

Climate change compounds environmental and development challenges. Changing climate already manifests itself in rising temperatures and more prevalent heatwaves, melting in the cryosphere, and an increased risk of Glacial Lake Outburst Flooding (GLOF) in mountainous regions, as well as a rising sea level, accelerated coastal erosion, and salination of surface and groundwater.

According to 2017 population census reports, the total population of the Pakistan is approximately 207 million. The most heavily populated province is Punjab with a population of 110 million, followed by Sindh with 48 million Khyber Pakhtunkhwa with 30 million and Balochistan with a population of 12 million. The population of Islamabad Capital Territory is 2 million, while that of FATA is 5 million. The population density is 250 persons per square km of the major part of the project area. The urban centers are densely populated with an average of 1000 person per square kilometer. Districts located close to the city centers are thickly populated, whereas, the districts lying in the southern and northern boundaries are relatively thinly populated.

Urbanization growth in Pakistan is currently at 2.7 percent. The urban population shows a growing trend with 36.38 percent of the population living in urban areas. Sindh province is the most urbanized among all the provinces in Pakistan as per the results with 52.02 percent of its population based in urban areas. Punjab has the highest share of population of 52.9 percent in population pie but its share has declined as compared to 1998. The share of urban population in Punjab has increased from 31.27 percent in 1998 to 36.71 percent in 2017.

Environmental challenges of rapid urbanization include air, water, land and noise pollution, deforestation and habitat degradation resulting in serious health issues, poverty, water stresses and climatic changes. Pakistan has been urbanizing rapidly and it is estimated that about 50 percent of the population will be living in urban areas by 2030. This has translated into Pakistan being ranked as one of the countries with the highest levels of exposure to air pollution in the South Asia region, measured as mean annual exposure to fine particulate matter (PM 2.5).

The Pakistan Vision 2025 identified six technologies that are likely to drive the future of development in the country, namely: micro-electronics, computers, telecommunications, human-made materials, robotics, and biotechnology. Specifically, the growth in Information and Communication Technology (ICT) has shifted the world to a virtual space, particularly for the delivery of services, and has given birth to a new global operating model for businesses. The various environmental hazards of ICT, from production/manufacturing, distribution, consumption/operations and disposal stages have been categorized as climate change, ozone depletion, terrestrial acidification, freshwater and marine eutrophication, human toxicity, photochemical oxidant formation, terrestrial, freshwater and marine ecotoxicity, particulate matter formation, metal depletion and fossil

depletion, agricultural and urban land occupation, natural land transformation and ionizing radiation.

Environmental and Social Baseline: Social Challenges relevant to the Project's Proposed Activities

The objective of HEDP to support research excellence in strategic sectors of the economy, improve teaching and learning and strengthen governance, in the higher education sector will result in a number of social benefits. However, given the competitive nature of project activities, specifically research and entreprenuerial grants, there is a risk of social exclusion and discriminiation.

HEC data shows that 40% of the total students enrolled in Master, MS, MPhil and PhD were female in 2017-18. However, the proportion of female students in engineering, science and technology universities is observed to be low, ranging from 10% to 25%. Representation of women in research is also low. Statistics for the National Research Programme for Universities (NRPU) and Technology Development Fund (TDF) show that only 16% of the principal investigators in the accepted TDF projects in 2017-18 were female, while only 14% of the principal investigators for projects accepted under the NRPU from 2010-2014 were female. Enrollment figures for 2016-17 show that 55% of students enrolled in ACs were female.

Statistics for PhD enrollment and research grants show that almost half of all students' research is being conducted in Punjab, with historically underserved areas such a Balochistan having a very small proportion. HEC reports that in 2017-18, the highest number of PhD students were reported in Punjab (55%), followed by 21% in universities located in Islamabad. Similarly, majority of the NRPU grants from 2010-2014 were awarded to researchers based in universities in Punjab (43%), followed by universities in Islamabad 29%, 14% in KPK, 10% in Sindh and only 2% to universities in Balochistan.

As per data provided by HEC, there are 3032 affiliated colleges (ACs) located across Pakistan, 95% of which are located in urban areas. 45% of students are enrolled in Affiliated Colleges in Punjab, followed by 24% in Khyber Pakhtunkhwa and 22% in Sindh. Balochistan has a mere 3% of the students enrolled in Affiliated Colleges.

There is also risk of low quality research outcomes from grants as well as non-applicability of research to contribute towards solving societal and economic problems in Pakistan. An analysis of four years of PhD theses uploaded to the Pakistan Research Repository from 2014 – 2017 shows that a total of 2468 theses were published and uploaded to the PRR during this period, of which 26% can be classified in subjects relevant to the priority sectors identified for the project. Further analysis based on PhD titles and abstracts provided on PRR for theses published in 2017 shows that just 34% of the research conducted in the strategic sectors had potential applications for the public and private sector.

Spending on research and development in Pakistan has been exceptionally low, with only 0.25% of the GDP being invested into R&D in 2015.[2] Major research funding in Pakistan is through HEC funds such as the NRPU and the Technology Development Fund, the Pakistan Science Foundation, COMSTECH and Ignite. The HEC has been increasing research funding in these programmes which primarily fund research in science and technology. The majority research projects are funded by the NRPU in science and technology, with a mere 3% projects being in social and political sciences. [3].

Regulatory Review

Following national policies and laws are relevant to the project and linked sub-projects with respect to environmental guidelines and identification of environment and social issues and accordingly researches need to be conducted for specific issues:

National Policies:

- ❑ Climate Change Policy of Pakistan 2012
- ❑ National Environmental Policy, 2005

National Laws:

- ❑ Pakistan Environmental Protection Act 1997
- ❑ Provincial Environmental Protection Acts of Punjab, Khyber Pakhtun Khwa, Sindh and Balochistan
- ❑ Pakistan Climate Change Act 2016
- ❑ Forest Protection Laws and Rules
- ❑ The Canal and Drainage Act 1873
- ❑ Pakistan Penal Code
- ❑ The Antiquities Act, 1975
- ❑ The Public Health (Emergency Provision) Act 1954 read with West Pakistan Epidemic Control Act 1958
- ❑ Building Code of Pakistan (Seismic Provisions-2007)
- ❑ Provincial Local Government Ordinances, 2001
- ❑ Land Acquisition Act 1894

World Bank Safeguard Policies: The World Bank safeguard policies and their relevance to the project is presented in the table below.

WB Safeguard Policies Relevance

No.	Operational Policies		HEDP Relevance
1	Environmental Assessment [OP 4.01]	To help ensure the environmental and social soundness and sustainability of investment projects.	Yes, However, no significant and/or irreversible adverse environmental impacts are anticipated from the investments

[2] The World Bank - https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?end=2015&locations=PK&start=1997

[3] The University Research System in Pakistan, 2018, The Knowledge Platform and British Council

			(including some IT equipment replacements) and technical activities to be financed, which will be mostly delivered as small works to improve existing education and scientific facilities and research grants. Even though the project research activities (to be financed through the Grand Challenge Fund, the Technology Transfer Support Fund, the Innovator Seed Fund and Local Challenge Funds) would be related to sectors involving environmental issues as pollution, use of natural resources, etc. the overall impact of the project is positive. The provision of access to modern technology could lead to a limited potential of e-waste management and recycling. Because the precise details and exact locations of the investments (small works to be identified) are not known and defined, an Environmental Management Framework (ESMF) has been prepared. different types of activities supported by the project.
2	Performance Standards for Private Sector Activities [OP 4.03]	To facilitate Bank financing for private sector led economic development projects by applying environmental and social policy standards that are better suited to the private sector, while enhancing greater policy coherence and cooperation across the World Bank Group.	This policy is not triggered as this is not a for private sector led economic development project.
3	Natural Habitats [OP 4.04]	To promote environmentally sustainable development by supporting the protection, conservation, maintenance, and	This policy is triggered with a precautionary approach. By appraisal it is not clear if the project will support research activities

		rehabilitation of natural habitats and their functions.	involving natural habitats. As the funds supported by the project will target the environment sector, the ESMF includes a screening protocol to identify this potential scenario during the submission and evaluation of research grants and to advise project proponents with specific management measures, if necessary. In particular, this policy is also triggered because some research activities could involve forest areas and may be located near or inside the protected forest, which are also considered as natural habitats as per the this policy.
4	Pest Management [OP 4.09]	To minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, and environmentally sound pest management.	Yes, as project interventions are likely to be carried for agriculture sector. These researches and interventions might require pest management.
5	Indigenous Peoples [OP 4.10]	To design and implement projects in a way that fosters full respect for Indigenous Peoples' dignity, human rights, and cultural uniqueness and so that they: (a) receive culturally compatible social and economic benefits; and (b) do not suffer adverse effects during the development process.	This policy is triggered with a precautionary approach. No physical investments are planned for IP areas. In case research proposals for Kailash people, valleys or land, are considered, all such proposals will need to be vetted by the World Bank (under guidance of OP 4.10 and ESMF which will contain guidelines on screening the proposals for any impact on Kalash as per provisions of OP4.10) and will be required to acquire all necessary and relevant clearances from the Bank. This due diligence will be carried out before initiating any type of review process by any entity and has been clarified in the ESMF.
6	Physical Cultural Resources	To assist in preserving physical cultural resources and avoiding their destruction or damage.	No relevance is anticipated. The project will not fund proposals

	[OP 4.11]	PCR includes resources of archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance.	involving activities related to physical cultural resources.
7	Involuntary Resettlement [OP 4.12]	To avoid or minimize involuntary resettlement and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	No relevance is anticipated. The project will not fund proposals involving activities related to involuntary resettlement.
8	Forests [OP 4.36]	To realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.	Some research activities related to the climate change/environment sectors could involve forest areas and may be located near or inside the protected forest. The ESMF includes the specific screening mechanism to identify this scenario, and to request to the research project proponents the incorporation of sustainability and protection measures in line with the forest safeguards policy.
9	Safety of Dams [OP 4.37]	To assure quality and safety in the design and construction of new dams and the rehabilitation of existing dams, and in carrying out activities that may be affected by an existing dam.	No direct relevance is anticipated. **The project will not fund proposals involving activities related to safety of dams**
10	Projects in Disputed Areas [OP 7.60]	To assure that a project in a disputed area if the governments concerned agree that, pending the settlement of the dispute, the project proposed for country A should go forward without prejudice to the claims of country B.	No direct relevance is anticipated. **The project will not fund proposals involving activities related to projects in disputed areas.**

11	Projects on International Waterways [OP 7.50]	To ensure that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity.	No direct relevance is anticipated. **The project will not fund proposals involving activities related to projects on international waterways**.
12	Bank Disclosure Policy	Under the policy, the Bank would provide access to more information about projects under preparation, projects under implementation, analytic and advisory activities and Board proceedings	Yes

Stakeholders Consultations

'Stakeholder' refers to individuals or groups who: (a) are affected or likely to be affected by the project (project-affected parties); and (b) may have an interest in the project (other interested parties). For the Project, the primary stakeholders include the Higher Education Commission, the Universities, Affiliated Degree Colleges, Teacher Academies in KPK and Balochistan and teacher training institutes in other Provinces; students and teachers of the concerned institutions.

In addition, the research proposal activities as well as the interventions related to small work will have to duly go through the consultation process during the reparation stage following the World Bank consultation standards.

As part of the Social Assessment conducted for HEDP, key informant interviews (KII) were conducted using structured questionnaires developed with the advice and in discussion with the Higher Education Commission. The KIIs were used to gather information on the current situation of research in Pakistan, status of affiliated colleges, and identify major challenges faced by higher education institutes in conducting quality research. A total of 12 interviews were conducted with HEC and universities.

Stakeholder consultations were conducted to explain the project components along with potential environmental and social risks. Prior to the consultations, the ESMF was disclosed on the HEC website and stakeholders were invited to provide their feedback. A three hour consultation was held on April 10, 2019, with participants from 36 Public Universities from all across Pakistan. Participants from each university comprised of their registrars, treasurers, staff from Quality Enhancement Cells (QECs) and Offices of Research, Innovation and Commercialization (ORICs), female and male faculty, and students.

Representatives of the Higher Education Departments (HEDs) from four provinces (Punjab, Sindh, Balochistan, Khyber Pakhtunkhwa) were invited to participate in the consultation exercise along with the principals, faculty and students from at least 4 public Affiliated Colleges (2 of each, male and female) of their province. The three hour consultation on April 11, 2019 was attended by HED officers and principals, administrative

staff, faculty and students of Affiliated Colleges from Punjab, Balochistan and Khyber Pakhtunkhwa. Registrars and staff of QECs of several public universities also joined this consultation.

This ESMF has been revised based on the feedback received during these consultations.

Potential Environmental Impacts and Mitigation Measures

The proposed Project aims to support the Government of Pakistan in strengthening the tertiary education system in the country. The project will support the innovative strategic research through competitive financing under: Grand Challenge Fund (GCF); Innovator Seed Fund (ISF); and Technology Transfer Support Fund (TTSF).

It is anticipated that the proposed project will support research under following categories of research areas through above mentioned funding arrangements: (a) Arts, Humanities, Social Sciences and Economics; (b) Business and Management; (c) Physical, Biological, and Earth Sciences; (d) Engineering and Technology; (e) Energy and Renewable Energy; (f) Waste Recycling; (g) Climate Change Resilience [Disaster] and Environment; (h) Medical, Health, and Nutritional Sciences; and (i) Agriculture, Livestock and Fisheries.

It is also anticipated that research under some categories may not have any adverse environmental and social impacts, however the others may have negative environmental and social impacts. The research activities may involve laboratory or field-based research work. At this stage the type, extent and exact location of the project(s) and subproject(s) are not known and may not be known at the appraisal stage, the requirement to carry out a detailed environmental and social analysis will be done as part of the project implementation phase. To identify potential environmental and social impacts at proposal screening stage for any project(s) or subproject(s), an environmental and social analysis/screening seems essential and need to be done during project approval for funding.

The following screening processes are proposed for the funding approvals:

- *Research Projects:*
  - Identification of possible environmental and social impacts of the proposed project(s) and subproject(s). In some cases, this could be limited to a simple assessment of laboratory facilities and their experience on laboratory. The checklist for such research proposals is attached as [Annexure 4].
  - As part of the same screening process, HEC will also determine the proposed research project(s) and subproject(s) which can be categorized under the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 [Annexure 1], have to fulfill the applicable legal requirements including either Initial Environmental Examination [IEE], Environmental Impact Assessment [EIA] or any other applicable requirement; and
- *Small Works Projects:*
  - The proponent of the proposed project(s) and subproject(s) involving infrastructure renovation and/or refurbishing construction works, fulfilling

eligibility criteria for funding, have to be screened through checklist. This screening is intended to identify the activities that may have environmental and social impacts.

The potential environmental and social aspects and impacts of the anticipated project(s) and subproject(s) activities may include:

- Vegetation: Loss of aesthetic of the area due to local level air pollution
- Air: Local level project specific air pollution resulting in poor visibility, loss of vegetation, property damages, acid rain, soil contamination and health implications on workers and nearby community
- Wastewater: Soil and water contamination, odor, health implications (due to breeding of mosquitos and flies), and nuisance due to improper treatment and disposal of sanitary wastewater from construction camps.
- Solid Waste and Soil Contamination: Nuisance, health implications on workers and community (due to breeding of mosquitos and flies) (if not disposed/treated properly). Soil contamination due to improper disposal of hazardous solid waste.
- Noise: Nuisance, health implications on workers and nearby community, loss of biodiversity.
- Occupational Health and Safety [OH&S]: Safety hazards for workers and community.

The mitigation measures of the significant environmental and social impacts [if identified] will be required from the project(s) and subproject(s) proponent in the form of a comprehensive impact mitigation plan.

The project has also a limited potential of generation of E-waste while there is no policy in place to manage and dispose of E-waste (for e.g. computers, printers etc.)

Potential Social Impacts and Mitigation Measures

Being a project focusing on education, HEDP has numerous benefits related to improving the quality of higher education and research in Pakistan. However, given the diversity and spread of this project, there is a risk that project activities will not be socially inclusive and equitable. The possible social risks associated with HEDP relate to gender exclusion, geographical exclusion, discrimination and inability of the project to contribute towards solving societal and economic problems.

The social risks associated with each component of HEDP are presented below.

Project Component	Social Risk
Component 1: Nurturing Excellence in Strategic Sectors	Moderate risk of gender exclusion, geographical exclusion, and inability of the project to contribute towards solving societal and economic problems.

Component 2: Supporting Decentralized Higher Education Institutes for improved teaching and learning	Moderate risk of gender exclusion, and geographical exclusion.
Component 3: Equipping Students and Higher Education Institutions with Modern Technology	Limited to low social risk
Component 4: Higher Education Management Information System and Data Driven Services	Limited to low social risk
Component 5: Capacity Building, Project Management, Monitoring and Evaluation	Limited to low social risk

Institutional Arrangements for ESMF Implementation

HEC will set up a **Project Coordination Unit (PCU)** for taking care of the day-to-day operations, while the thematic and other operational matters of the project/subprojects such as planning, procurements, finances, training and capacity-building, ICT, monitoring, reporting, etc. will be dealt by the respective **Section/Division/Cell** of HEC such as LI, Academics, QAA, R&D, M&E, etc. For this purpose, the concerned staff members will be well oriented and trained in their respective fields related to the project/subproject's activities.

The objectives for environmental and social management under PCU are:

1. Analyze the potential environmental and social impacts in research and small work projects to be financed.
2. Consider the potential environmental and social impacts in research and small work projects during the evaluation stage.
3. Include specific measures to avoid environmental and social impacts of selected research and small work projects
4. Ensure adequate supervision and monitoring during the implementation of the research and small work projects, including OSH aspect.

An Environmental and Social Cell (ESC) shall operate under PCU which shall take care of the environmental and social safeguard requirements of the project components. The ESC shall be comprised of environmental and social specialists. The ESC shall have the liberty to outsource environmental and social compliance requirements to different consultants and specialists. The consultants shall facilitate ESC in preparing environmental and social assessment, monitoring and compliance documents. The ESC has to ensure the compliance of ESMF including:

- ❑ The review of environmental assessments or documents that analyze the environmental and social impacts of the grants.
- ❑ Field supervision of social and environmental aspects of the proposals.
- ❑ Ensure compliance of mitigation measure and request the suspension of disbursements to beneficiaries until the necessary remedial action are implemented.

- When necessary, consult with other national and provincial entities with competencies in environmental and social management.
- Preparation of internal reports.

Grievance Redress Mechanism

The HEC will respond to concerns and grievances of project affected parties related to the environmental and social performance of the project in a timely manner. For this purpose, the HEC will propose and implement a grievance redress mechanism (GRM). The HEC shall establish a Grievance Redress Mechanism (GRM) to facilitate the resolution of community, project(s) and subproject(s) complaints and grievances. Under this mechanism, a Grievance Redress Cell (GRC) shall be established in the Project Coordination Unit. This GRC shall be directly accessible to the community, project(s) and subproject(s) for the registration of complaints and their resolution. The established GRM shall be communicated to the public and particularly the affected community through print and electronic media and during public consultations and community engagement events. This cell shall maintain a Complaints Management Register (CMR), at the site, for logging complaints and grievances. All written and oral grievances will be recorded in the Register. For operational phase GRM, the respective Engineers and Plant Managers of the utilities and plants respectively shall be responsible for maintaining community complaints in the CCMR and their resolution. Android based GRM Application (GRM App) shall also be established and launched to make GRM effective, easy and accessible to everybody for lodging complaints. PCU will ensure that GRM system will be implemented at the associated universities level.

Budget

The 5 year budget for the implementation of ESMF is estimated at 67.5 million PKR [482,143 USD @1USD=140PKR].

Table of Contents

LIST OF TABLES

LIST OF FIGURES

1 INTRODUCTION

This chapter provides background of the project and its components, which are being proposed to be financed by the World Bank, profile of the proponent and the Environmental & Social Management Framework (ESMF) for these projects. In compliance with Environment Assessment OP4.01 triggered by the HEDP, inter alia, ESMF is required for the World Bank financed projects to ensure compliance of environmental and social safeguard requirements of the national laws and World Bank's safeguard policies for those project activities that are not defined and/or whose locations are unknown at the time the Bank appraises the project. Therefore, the ESMF will set out the policies, strategies, procedures and institutional requirements to screen the activities when their locations are identified and/or defined, the environmental and social documents required for these activities and the approval and clearance procedures to be followed.

1.1 Background

In Pakistan tertiary education refers to the post-secondary education, offered by two distinct educational sub-sectors: University/degree awarding institutes (DAIs) and affiliated colleges (ACs). Each of the sub-sector is governed by different institutional set ups under different administration, posing a challenge to assure quality and good governance. Both subsectors are comprised of public and private institutions; the later holding larger share of the sector and Higher Education Councils (HEC) predicts that the situation will continue. Universities are regulated by the Higher Education Commission (HEC) of Pakistan, whereas ACs are under dual management. For administrative matters, these have to report their respective provincial higher education departments whereas for academic matters, these follow the standards of their affiliating universities (AUs). ACs obtain financial support from their respective provincial governments but their tertiary level degrees are awarded by the AUs.

The quality of Higher Education in the country is hindered by inequitable participation in tertiary education, poor quality of teaching and research conditions, insufficient funding and inadequate institutional governance. To overcome these challenges, the Higher Education Commission of Pakistan plans to obtain the World Bank's support through a project, entitled "Higher Education Development Program" (HEDP).

1.2 The Proponent: Higher Education Commission of Pakistan

The Higher Education Commission of Pakistan, established in 2002, is the apex regulatory body to oversee the matters of higher education in the country and ensure highest quality and standards. The Chairperson heads the Commission under the supervision of the Prime Minister of Pakistan.

1.3 The Project

The proposed World Bank support entitled "Higher Education Development Program (*HEDP*)" aims to support the Government of Pakistan in strengthening the tertiary

education system in the country. The proposed development objective(s) To support research excellence in strategic sectors of the economy, improve teaching and learning and strengthen governance, in the higher education sector.

The Higher Education Commission of Pakistan will implement the project in selected universities and degree colleges of the country. The four major components of the Project are as under:

Component 1. Nurturing excellence in strategic sectors

Sub-component 1.1: Promoting Innovative and Relevant Research
Sub-component 1.2: Encouraging Entrepreneurship and Self-employment
Sub-component 1.3: Local Challenge Funds

Component 2: Supporting Decentralized Higher Education Institutes for improved teaching and learning

Sub-component 2.1: Strengthening the Affiliation System
Sub-component 2.2: Bringing Education in Affiliated Colleges at par with International Standards
Sub-component 2.3: Improving the relevance of ACs to support the local socio-economic landscape
Sub-component 2.4: Connecting Affiliated Colleges to Pakistan Education and Research Network

Component 3: Equipping students and higher education institutions with modern technology

Subcomponent 3.1: Improving the policy environment for ICT use
Subcomponent 3.2: Enhancing PERN Activities
Subcomponent 3.3: Expanding PERN vertically

Component 4: **Component 4: Higher Education Management Information System and Data Driven Services**
Subcomponent 4.1: HEC Data Repository
Subcomponent 4.2: Digitization of University Administration

Component 5: Component 5: Capacity Building, Project Management, Monitoring and Evaluation

1.4 Environmental & Social Management Framework (ESMF)

The Environmental and Social Management Framework (ESMF) will be used by the proponent during designing, construction and operational phases of the project components to ensure safeguard compliance and mitigate environmental and social

impacts at all the stages of the project as per the environmental and social management plan provided in the framework.

This ESMF has been prepared using primary and secondary information collected through literature review, reconnaissance survey and stakeholder consultation. This framework will be followed once the research sub-projects and small works are identified and their details are available. This framework will also discuss the stakeholder engagement and involvement throughout the project life cycle and mechanism to disclose project information to them and redress the grievances of the affected community.

1.4.1 Applicability of the report

The proposed project interventions could have potential environmental and social impacts, which are most likely to be small scale, localized, and reversible in nature, specifically under the Component 1. Because of the nature of the grant funding mechanisms of the project, a framework approach is required to implement the environmental and social management guidelines for this project.

The World Bank Operational Policy 4.01 Environmental Assessment (OP 4.01) states that "The Bank requires environmental assessment (EA) and management of social impacts of projects proposed for Bank financing to help ensure that these are environmentally and socially sound and sustainable, and thus to improve decision making"[4]. By ensuring ESMF, the Bank seeks to[5]:

- ❑ Avoid or mitigate adverse impacts to people and the environment;
- ❑ Conserve or rehabilitate biodiversity and natural habitats, and promote the efficient and equitable use of natural resources and ecosystem services;
- ❑ Promote worker and community health and safety;
- ❑ Ensure that there is no prejudice or discrimination toward project-affected individuals or communities and give particular consideration to Indigenous Peoples, minority groups, and those disadvantaged or vulnerable, especially where adverse impacts may arise or development benefits are to be shared;
- ❑ Address project-level impacts on climate change and consider the impacts of climate change on the selection, siting, planning, design and implementation and decommissioning of projects; and
- ❑ Maximize stakeholder engagement through enhanced consultation, participation and accountability.

1.4.2 Objectives of the ESMF

An Environmental and Social Management Framework (ESMF) will serve as the roadmap outlining the prerequisite environmental and social safeguard requirements for the project and its components.

[4]http://web.worldbank.org/WBSITE/EXTERNAL/PROJECTS/EXTPOLICIES/EXTOPMANUAL/0,,contentMDK:20064614~menuPK:64701637~pagePK:64709096~piPK:64709108~theSitePK:502184~isCURL:Y,00.html

[5] World Bank, 2016. "World Bank Environmental and Social Framework." World Bank, Washington, DC

Since the nature, extent and location of the project activities (subprojects), requiring physical intervention and thus potentially causing environmental degradation and social impacts, are not known at this stage, a "framework" approach has been adopted during the present environmental and social assessment, and an ESMF has been prepared. The specific objectives of the ESMF are to:

- To assess the existing environmental and socioeconomic conditions of the project areas,
- To identify potential generic impacts of the proposed project on the natural, social and human environment of the areas, to predict and evaluate these impacts, and determine their significance, in the light of the technical and regulatory concerns,
- To propose appropriate generic mitigation measures that should be incorporated in the design of the project (and subprojects to be designed and implemented during project implementation) to avoid or minimize if not eliminate the potentially adverse impacts,
- To assess the compliance status of the proposed activities with respect to the national environmental legislation and WB's OPs,
- To provide basic screening and assessment criteria, list the type of assessment to be carried out and instruments to be developed for each subproject/component, and provide institutional, monitoring, reporting and documentation measures for environmental and social safeguards compliance.

1.4.3 Structure of ESMF

The ESMF consists of eight chapters. Table 1 gives the brief of each chapter:

Table 1: Brief of ESMF

	Executive Summary	***Provides general summary of the ESMF contents and key findings.***
1	Introduction	*Background of the project and their brief description, information of the proponents, introduction of the ESMF, its objective and structure, and study team.*
2	Project Description	*Detailed description of project, its components and* institutional arrangements for the implementation of ESMF and environmental and social management of the project and sub-projects
3	Environmental and Social Baseline	Description of environmental and social baseline of the entire project area.
4	Regulatory Review	Brief description of the national, provincial and World Bank laws, policies, strategies, guidelines, codes and procedures for the categorization, screening, environmental assessment and compliance of the proposed project/subprojects. This chapter establishes that how the various requirements have been or will be complied with during the planning and implementation stages of the subprojects.

5	Potential Environmental and Social Impacts and Mitigation Measures	Description of potential generic environmental and social risks and impacts (direct, indirect/induced and cumulative) to be caused by the project's construction and operation phases on surrounding environment and community. Description of mitigation measures as per mitigation hierarchy (avoidance, minimization or reduction, mitigation, compensate/offset).
6	Stakeholder Consultation	Describes the objective, process, and outcome of the stakeholder consultations carried out during the ESMF preparation.
		.
7	Grievance Redress Mechanism	Description of the Grievance Redress Mechanism to be adopted by the proponent to facilitate resolution of any community complaints and grievances about the project's environmental and social performance, in line with the requirements of World Bank.
8	Budget	Estimated budget for executing the ESMF, monitoring cost etc.
	Annexures	Checklists, Pakistan Environmental Regulations

2 PROJECT DESCRIPTION

2.1 Background

In Pakistan tertiary education refers to the post-secondary education, offered by two distinct educational sub-sectors: University/degree awarding institutes (DAIs) and affiliated colleges (ACs). Each of the sub-sector is governed by different institutional set ups under different administration, posing a challenge to assure quality and good governance. Both subsectors are comprised of public and private institutions; the later holding larger share of the sector and Higher Education Councils (HEC) predicts that the situation will continue. Universities are regulated by the Higher Education Commission (HEC) of Pakistan, whereas ACs are under dual management. For administrative matters, these have to report their respective provincial higher education departments, whereas for academic matters, these follow the standards of their affiliating universities (AUs). ACs obtain financial support from their respective provincial governments but their tertiary level degrees are awarded by the AUs.

After decades of neglect, the Pakistan's tertiary education sector has seen a revival with the establishment of HEC in 2002, which was granted more funding and autonomy as compared to the previous institutions. HEC introduced initiatives to improve quality and instill a culture of research. It closed low quality programs and controlled the mushrooming of sub-standard higher education institutions. Despite making considerable headway towards addressing the challenges facing the tertiary education system, much remains to be accomplished, especially in the multi-layered governance of the sector.

The four major challenges in the way of meeting the priorities, identified in the 11th Five Year Plan and the Higher Education Commission's ambitious Vision 2025 development strategy are: (a) low and inequitable participation in tertiary education; (b) poor quality of teaching and research conditions [including inadequate and irrelevant research, and limited links between Higher Education Institutions (HEIs) and the industrial and service sectors of the economy]; (c) insufficient funding; and (d) below-par institutional governance and management, especially lack of the Higher Education Management Information System (HEMIS), which severely complicates long-term sectoral and institutional planning, monitoring and accountability. These challenges are particularly exacerbated for affiliated colleges.

The proposed World Bank support entitled "Higher Education Development Program (*HEDP*)" aims to support the Government of Pakistan in strengthening the tertiary education system in the country. The proposed development objective(s) is to support research excellence in strategic sectors of the economy, improve teaching and learning and strengthen governance, in the higher education sector.

2.2 Project Beneficiaries

Table 2 provides summary of the Project's beneficiaries.

Table 2: Summary of Project Beneficiaries

Organizations/Institutional Strengthening			Individuals/ Human Resource Development		
Direct	**Type/ Number**	**Indirect**	**Direct**	**No.**	**Indirect**
Higher Education Commission's Divisions such as IT, HRD, R&D, LI, Academics and M&E	Component 4 (HEMIS, PERN3)	Federal and Provincial Examination Boards (to assess and improve the quality of learning outcomes)	Senior and mid-level staff of HEC representing IT, HRD, R&D, LI, M&E Divisions'	300	Public at large
Affiliating Universities (Works and Services, Laboratories, IT infrastructure, ORIC, QECs, Disciplines obtaining grants)	Component-1, 20 (Tier 1 universities) Component-2, 31 (tier 2 universities)	Textbook boards (for learning material, revised curriculum for UG/Post-graduation, Distance learning material (C3)	University faculty	990	Public at large
Affiliated colleges (PERN connectivity, QECs, faculty development, online teaching-learning assessment)	500	Directorates of Education at Federal and Provincial Government level	AC (faculty development)	7,500	Public at large
Community Colleges (same as above)	20		CC (faculty development)	500	Public at large
Accreditation Councils (to strengthen the existing and develop national Accreditation Council)	15	Teacher Training Academies in KPK and Balochistan and Teacher Education institutes in other Provinces	Senior and mid-level staff (capacity development)	150	Public at large

2.3 Project Components and activities

The World Bank supported project "Higher Education Development Program (HEDP)" aims to assist the Government of Pakistan in strengthening the tertiary education system in the country. The proposed development objective is support research excellence in strategic sectors of the economy, improve teaching and learning and strengthen governance, in the higher education sector.

The Higher Education Commission of Pakistan will implement the project in selected universities and affiliated colleges in the country. The project will have 5 main components, as detailed in the following sections.[6]

[6] Source: HEDP Project Appraisal Document, The World Bank

2.3.1 Component 1: Nurturing Excellence in Strategic Sectors

This component will help promote relevant and cutting-edge research in universities in Pakistan with a focus on specific strategic sectors for socio-economic progress of the country. This will be done through providing competitive research, innovation and commercialization grants to researchers and entrepreneurs.

Sub-component 1.1: Promoting Innovative and Relevant Research

This sub-component will focus on development and support of relevant and cutting-edge research in universities, both private and public, as well as encouraging commercialization of research. The project will do so through the establishment of two competitive funds: (i) mega research grants supporting cutting edge research for solution of specific national challenges which may require multi-disciplinary solutions; and (ii) funds supporting faculty and students with potential industrial prototype solutions and research projects to make them market relevant and industry ready and to support with industry partnerships..

The Grand Challenge Fund (GCF) will support large and multisectoral/ multidimensional research projects focused on specific themes within sectors of national interest. The proposals eligible for funding would be from the following strategic sectors: (a) Food Security; (b) Water management and sustainability; (c) Sustainable energy; (d) Sociology/philosophy; (e) Development Economics; (f) urban planning; (g) climate change/environment; and (h) IT/telecom (especially, Artificial Intelligence, Cyber Security, Cloud Computing and Big Data); (i) innovative governance and reforms. Within these strategic areas, proposals from consortia of multi-disciplinary researchers/universities can propose research for solutions of a grand challenge.

The Technology Transfer Support Fund (TTSF) will support promising technological research with an existing prototype or advanced model for industrialization/commercialization. The fund will be open to existing students and faculty members of both public and private universities in partnership with local industry. The TTSF will be targeted to specific sectors including telecommunication, information and technology and its application in health, textile, agriculture and agri-business such as dairy; engineering sciences, microelectronics, water, power, energy and fleet management; biotechnology; and material sciences, for example nano-technology. The support package will be executed through the Offices of Research Innovation and Commercialization (ORIC). If the selected researchers are from a university which does not have an ORIC, HEC's selection committee will assign the research team to work with a functional ORIC within geographical proximity of the research team.

Subcomponent 1.2: Encouraging Entrepreneurship and Self-employment

This fund will provide a package of support through a seed fund to university students, recent graduates and faculty from both private and public universities. It will provide financial support for commercialization of a product or service, and/or incubation for a start-up. The package will also include entrepreneurial training, legal training and support, financial education and training among other services. The Innovator Seed Fund (ISF) will be implemented and supported through the Business Incubation Centers (BICs) already established and functional within specific universities in Pakistan.

Sub-component 1.3: Local Challenge Funds

This fund will encourage the Tier 2 universities/Higher Education Institutes to establish and strengthen their research capacities by competing for research grants for solutions for pressing socio-economic problems within the district or locality that the university is located in. The grant will be open to research addressing any of the seventeen Sustainable Development Goal targets, with a focus on generating or adapting solution to the local district/division level in Pakistan. The Local Challenge Fund will be setup as a matching grant fund with the province contributing to the research grant. The research grants will be selected on merit taking into account the relevance of the research to the local community, industry and local government.

2.3.2 Component 2: Supporting Decentralized Higher Education Institutes for Improved Teaching and Learning

This component aims to improve the quality of education delivered by the Affiliated Colleges (ACs). The component will support almost 500 public ACs in improved teaching and learning activities by; (i) strengthening the college affiliation system; (ii) improving the curriculum offered in the ACs via change in the types of degree offered; (iii) encourage diversity of students being enrolled and link students and graduates to potential employers within the locality; (iv) improving monitoring and evaluation of the AC system; and (v) connecting ACs to the Pakistan Education Research Network..

Sub-component 2.1. Strengthening the Affiliation Mechanisms

In order to make the affiliation mechanism more efficient, the project will support interventions for making affiliating universities (AUs) more pro-active to support ACs and their ACs more responsive to AUs. Activities include the establishment of units in the Quality Enhancement Cells (QECs) of AUs which are dedicated to ACs and the formation of a “change team” in each AC. The AU units and the AC teams will enter into a memorandum of understanding spelling out their respective responsibilities. The project will support the development of new minimum quality standards for both entities.

Sub-component 2.2. Bringing Education in Affiliated Colleges at par with International Standards

The project will support a comprehensive strategy to bring Pakistan's tier 2 universities and ACs at par with international standards. First, it will facilitate the implementation of the HEC's mandate to roll out 4-year Bachelor programs based on a semester/credit structure through a strengthening and revision (as required) of the curricula.

The Bachelor Program has already been rolled out in almost 205 ACs, and will be rolled out in an additional 95 colleges during the life of the project. The project will support these colleges to transition and implement the program. The AU's QEC-ACs will be responsible for providing support to these colleges on a regular basis. Detailed ToRs for the QEC-ACs will be developed and include the description of responsibility towards the ACs.

HEC's vision is also to focus the roll-out of the Bachelor programs in tier-2 universities during the life of the project. While curriculum structure for a large number of programs has already been revised, its implementation needs continuous effort to put faculty staff in a position to implement the new program. The project will support this effort in about 32 Tier 2 universities. In addition, in these 32 AUs, the project will also support provision of integral teaching learning tools such library and reference books, basic laboratory equipment and some minor civil work as needed for effective implementation of a good quality bachelors' program. In addition, the project will support adoption of a gender policy which includes HEC's policy on sexual harassment in these universities.

Second, it will help develop the new 65-68 credit hour semester system Associate Degree (AD) program. The project will support the development of the new 2-year Associate Degree (AD) program, including curriculum framework and specified number of programs. The project will also support the roll-out of the AD programs in approximately 200 colleges through capacity building of faculty and management. The selection of these ACs for AD programs will be done by provincial governments, against criteria defined by HEC. Criteria include, inter alia, selection of at least 50 percent all women colleges. About 21 affiliating universities (AUs) will be involved and have been pre-identified.

The development of AD curricula will reflect the ACs' mission to equip students with mid-level skills and the need to strengthen STEM disciplines. Development of the curricula will include close consultation and engagement of the selected colleges' locality and local socio-economic needs. A need assessment will precede the implementation of an AD program in a specific AC.

Finally, it will support capacity development of faculty and management in almost 500 ACs and 32 AUs to implement the Bachelor program and the AD programs effectively. A comprehensive capacity building plan will be rolled out to facilitate the implementation of the revised curriculum and the semester structure of the AD and Bachelor program. In-service training will be provided to established faculty staff and administrative staff. The training of Master Trainers (faculty and management) will be conducted under the umbrella of the National Academy of Higher Education (NAHE). The Master Trainers trained will impart the further training through their Affiliated Universities' staff development centers.

Sub-component 2.3: Improving the relevance of ACs to support the local socio-economic landscape

The first set of interventions under this sub-component will support and encourage students, in particular girls to enroll in and continue their education within the new 4-year bachelor system; and support women to enter and progress in diversified fields of study such as material sciences and mathematics. The project will support female students and students from disadvantaged backgrounds in transitioning from a 2- year AD degree to a 4-year Bachelor program. This will be done through a bridging semester in the AUs offering the 4-year bachelors' degree - with particular emphasis on STEM disciplines where women are underrepresented allowing students to acquire the academic foundations needed for bachelor studies. At least 50% of the colleges that benefit from these bridge programs will be women colleges.

Second, the sub-component will support monitoring of the learning outcomes of the newly introduced degrees. AC student learning assessment will be piloted in order to measure progress linked to the project activities. In parallel, tracer studies will be conducted to assess the longer-term impact of the activities on the performance of AC students in the labor market.

Finally, the sub-component will support transformation of approximately 20 ACs of the selected 200 to community colleges on a pilot basis. HEC vision 2025 aims to introduce 150 Community Colleges in the country to provide more access and opportunities in academic, technical and vocational trades. These courses would also enable citizens of all ages to pursue diverse programs in order to develop their creative and problem-solving skills. With the project support, HEC intends to introduce 2 to 3 additional subjects of 3 credit hours each focusing on developing market driven technical skills in affiliated colleges offering Associate Degree programs. These courses will be developed as bridging semester/courses for AD to transition into the 4 year Bachelor Program. To support this transformation, 20 ACs will be selected from already targeted 200 colleges for Associate Degrees and provided the requisite curriculum and staff development from HEC, in collaboration with HEDs to implement these bridging programs.

Sub-component 2.4: Connecting Affiliated Colleges to Pakistan Education and Research Network (PERN)

As a part of its commitment to strengthen education and research enhancing connectivity for higher education institutes (supported through component 3 below), HEC will support the expansion of PERN to institutions (particularly affiliated colleges) using 'last-mile' connections. A total of 300 colleges will be added to the existing PERN network. As part of the last-mile connections, the colleges will receive a campus network, using eduroam technology that offers free WiFi to all staff and students. These connections will be created using the existing PERN infrastructure, that has already connected several affiliated colleges in a few provinces. Colleges will be selected based on Request for Proposals (RFPs), with proposals being submitted from the provincial authorities, affiliating universities and colleges. Credentials for college staff and students will be managed by either the affiliating universities or PERN centrally, depending on the level of readiness of the IT units in the relevant universities. A cost sharing agreement to ensure maintenance and running costs for PERN will be worked out between HEC and respective Higher Education Departments (HEDs) to ensure that the services provided under the project are sustained.

2.3.3 Component 3: Equipping Students and Higher Education Institutions with Modern Technology

The objective of this component is to leverage technology to improve the teaching, learning and research environment in Pakistan. This component has three main activities, namely (i) Updating the policy framework for ICT and online learning, (ii) Enhancing PERN Activities, (iii) Vertical expansion of PERN to provide a better service to higher education institutions.

.

Sub-component 3.1: Improving the policy environment for ICT use

This subcomponent will involve the drafting of a new ICT Strategy that sets out the overall vision on the use of technology, while also reviewing quality assurance and accreditation standards and guidelines to facilitate innovation. The new ICT Strategy will also focus on how PERN can be leveraged to develop blended education content, reflecting on the technology needs (Learning Management Systems (LMS), cloud-services, use of international vs. national bandwidth), as well as on the pedagogical and didactical model underlying the blended learning (flipping the classroom, use of learning outcomes, etc.).

Subcomponent 3.2: Enhancing PERN Activities

PERN is a leased fiber-optic network that connects all universities in Pakistan, providing both an internet connection and online services to facilitate teaching, learning and research. Over the last year, PERN has started the migration into its third phase, with expanded connectivity, and a better managed backbone. In line with this upgrade, the HEC will develop an improved governance system for PERN. This will include allocating more human resources to manage the network, as well as developing a model to further diversify generation of income to manage and sustain the network. PERN will also

professionalize its relationship with the universities, by giving universities more control over their campus networks (e.g. by facilitating more network monitoring and management and creating a measurement station at each Point of Presence or 'PoP'). Building on the Pakistan identity federation servers and its participation in eduGAIN (an international network connecting identity federations), PERN will improve Identity and Access Management (IAM), by giving universities Identity Provider Status (IDP status), and moving its services (digital library, network measurement, ticketing, Customer Relations Management platforms, etc.) under this new Identity Access Management infrastructure. Finally, PERN will expand its training offer to universities by creating a certified pool of master trainers, which can conduct training programs on a variety of topics related to network management and service offering.

Sub-component 3.3: Expanding PERN vertically

This sub-component will support the expansion of cloud services (X as a Service or XAAS), leveraging the new IAM infrastructure. PERN will use a platform-approach for cloud services, in line with international standards for NRENs. Some of these cloud services will be offered directly by PERN or by universities connected to PERN, while others can be offered by third parties to the members of PERN. One central cloud service is the expansion of data centers to create storage to enable other cloud services that can be offered through PERN (e.g. storing research data, video-data, student data, etc.). Secondly, PERN will procure a high-performance computing cluster that can be used for research purposes (i.e. big data analytics). A third service is the development of blended learning in universities, through the development of a platform from which universities can establish an LMS.

2.3.4 Component 4: Higher Education Management Information System and Data Driven Services

The objective of this component is to improve the usage of data for policy-decisions at national level and in higher education institutions. This subcomponent consists of two main activities. The first activity is the creation of a national level data repository at HEC, which can be used for planning and strategic purposes. The second activity is to digitize and automate the financial and student administration of the universities.

Subcomponent 4.1: HEC Data Repository

To create the data repository, the HEC will design a data system that maps out which kinds of indicators and variables are needed for its planning purposes. The data system will hold key variables (updated at least yearly, but ideally more frequently) on students, enrolments, staff, financials, facilities etc. of all universities in Pakistan. The repository will be created by developing a robust portal along with a data transferring tool. The data integrated into this solution is already collected as part of HEC's regulatory work (primarily by SIU and Finance Units) and is currently available in Excel format. Initially, HEC staff will feed the data into the portal from the existing proformas, and once the portal is

operational, the universities will be enabled to feed data into the system directly, through a data transferring tool that contains basic data validation.

Subcomponent 4.2: Digitization of University Administration

This subcomponent will support initiative to digitize the administration of universities, which will make university administration more transparent. This will include two sub-activities, (a) to develop a cloud-based enterprise resource planning system (ERP) to manage their human resources, finances and procurement tasks and (b) a digital student administration package that manages the student lifecycle. As a first step, the HEC will ask universities to express their interest and commitment to migrate their administration to an ERP. In the second step, HEC and the universities will index which administrative functions and tasks of the universities can be mapped to these systems. In the case of the ERP, this could potentially include e.g. signing documents, invoicing, payments, contracts, expenses, accounting, RFPs, bidding, and other functions. In the case of the student administration, this could potentially include core and ancillary solutions to take care of admissions; records and enrollment; courses, classes and scheduling; academic advisement, and; student financials, etc. These functions will be mapped to existing structures inside the administration of the universities, and a capacity assessment will be made for the transition. In a third step, bidding documents will be prepared, with the aim of procuring a commercial off the shelf system that is contextualized for the particular university sub-sectors. As a fourth step, the universities will pilot these systems, and attempt to migrate their functions to this new system. Once the system is operational, university administrators will be trained to use this new system.

2.3.5 Component 5: Capacity Building, Project Management, Monitoring and Evaluation

The project will support the implementation of the activities under various components and sub-components through a comprehensive but targeted set of technical assistance (TA) activities aimed at capacity building of HEC, universities and other relevant HEIs (including ACs). TA will be provided for following purposes:

(i) support to the ORICs and BICs for the implementation of both the TTSF grant and the ISF;
(ii) support to the HEC new directorate for ACs, Affiliating universities QEC units dedicated to ACs and ACs' change teams;
(iii) support the establishment of the NAHE, which will include capacity building through twinning programs with foreign and reputable universities offering packages similar to the objectives of NAHE. The capacity building activity will support institutionalization of academic and managerial trainings of the faculty and various levels of management staff of HEIs through a service provided by NAHE;
(iv) technical support for components 3 and 4

In addition to the capacity building TA, this component will support project operating costs such as cost of consultants hired for the implementation of the project supporting the HEC Project Coordination Division, operational cost such as equipment and supervision cost

(transportation and per diems). This will support the monitoring and evaluation of the project and verification of the DLI achievement including the hiring and reimbursement of third party verification agency. This component will also allow HEC and provincial governments to undertake or commission studies (including tracer surveys, satisfaction surveys, gender studies) and/or to recruit short term consultants as need unfolds during the project life.

2.4 Project Implementation

HEC will set up a **Project Coordination Unit (PCU)** for taking care of the day-to-day operations, while the thematic and other operational matters of the project/subprojects such as planning, procurements, finances, training and capacity-building, ICT, monitoring, reporting, etc. will be dealt by the respective **Section/Division/Cell** of HEC such as LI, Academics, QAA, R&D, M&E, etc.. For this purpose the concerned staff members will be well oriented and trained in their respective fields related to the project/subproject's activities.

2.4.1 Institutional Arrangement

The institutional arrangement for the environmental and social assessment of the project is presented in Figure 1.

The proponent HEC shall be responsible for the compliance of environmental and social safeguard requirements of the HEDP project components. The project activities at HEC shall be monitored and managed by the Project Coordination Unit (PCU), to be established specifically for HEDP. The objectives for environmental and social management under PCU are:

1. Analyze the potential environmental and social impacts in grants to be financed.
2. Consider the potential environmental and social impacts in grants during the evaluation stage.
3. Include specific measures to avoid environmental and social impacts of selected grants
4. Ensure adequate supervision and monitoring during the implementation of the grants, including OSH aspect.

The Environmental and Social Cell (ESC) shall operate under PCU which shall take care of the environmental and social safeguard requirements of the project components. The ESC shall be comprised of environmental and social specialists. The ESC shall have the liberty to outsource environmental and social compliance requirements to different consultants and specialists. The consultants shall facilitate ESC in preparing environmental and social assessment, monitoring and compliance documents. The ESC have to ensure the compliance of ESMF including:

- ❑ The review of environmental assessments or documents that analyze the environmental and social impacts of the grants.
- ❑ Field supervision of social and environmental aspects of the proposals.

- ❑ Ensure compliance of mitigation measure and request the suspension of disbursements to beneficiaries until the necessary remedial action are implemented.
- ❑ When necessary, consult with other national and provincial entities with competencies in environmental and social management.
- ❑ Preparation of internal reports.

The ESC shall ensure that each call for proposals must include environmental and social guidelines for proponents. These guidelines will ensure that proponents will comply with the following aspects in their proposals:

- ❑ Environmental and social risks of the proposed activities, especially those related to effluents, emission and the measures to manage them.
- ❑ Risks related to health, biosafety, chemical safety, radioactive safety and OHS, and the measures to manage these risks.
- ❑ Potential environmental impacts in ecosystems and the measures to minimize and avoid such impacts.
- ❑ Potential social impacts, on indigenous people and vulnerable groups, and the mechanisms to manage them.
- ❑ Environmental clearances/ no objections from the relevant entities, when necessary.

ESC shall approve or reject the project activities or research projects as per the screening outcome carried out during proposal stage. For all the project proposals, the following screening processes are proposed:

a) Research projects:
   - The proposed research project(s) and subproject(s) which can be categorized under the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 [Annexure 1], have to fulfill the applicable legal requirements including either Initial Environmental Examination [IEE], Environmental Impact Assessment [EIA] or any other applicable requirement; and
   - The laboratory-based research projects. These will go through a simple assessment of laboratory facilities and their experience on laboratory. This assessment will be in addition to the identification of possible environmental and social impacts of the proposed project(s) and subproject(s). The checklist for such research proposals is attached as [Annexure 4].

b) Small Works projects:
   - The proponent of the proposed project(s) and subproject(s) involving infrastructure renovation and/or refurbishing construction works, fulfilling eligibility criteria for funding, have to be screened through checklist [Annexure 2]. This screening is intended to identify the activities that may have environmental and social impacts. The specific measures that should be taken into consideration while evaluating such project(s) and

subproject(s) proposals are attached as [Annexure 3]. These measures will also be included as part of the bidding documents of contractors and in the documents that ward the grants.

The approved proposals will have to demonstrate that the relevant clearances would be obtained. This will be a disbursement condition for the grants. The ESC will be following environmental and social guidelines for screening of project proposals. The environmental and social guidelines are as follows:

- ❑ The project proposals must follow environmental and social compliance guidelines as described in the call of proposals.
- ❑ The project proposals must include the compliance of applicable and existing legal framework relevant to project proponents.
- ❑ Any project proposal involving risks for human health will have to get all the relevant clearance to certify that these would include adequate OS&H protection and control measures.
- ❑ Any project proposal with significant environmental impacts or involving risks for human health and that cannot be mitigated will be rejected.
- ❑ Any project proposal without facilities to endure ethical treatment of animals will not be financed.
- ❑ Any project proposal creating risk for protected areas, natural habitats or endangered/under risk of extinction species will not be financed.
- ❑ Any project proposal involving land use conversion near natural habitat will not be financed.
- ❑ Any project proposal involving works related to land acquisition, resettlement, physical or economic displacement, forced evictions or involuntary movements, indigenous people of Kailash, will not be financed.
- ❑ Any project proposal involving:
  - greenhouse or field activities using GMO will have to address and include plan for compliance with the biosafety measures.
  - laboratory activities, using pathogens or GMOs will adopt best practice biosafety measures and/or ISO standards.
  - laboratory activities, using nanotechnology will adopt the Economic European Community code for responsible conduct.
  - use of pesticides, will have to comply with the applicable legal requirements of use of pesticides. Moreover, the integrated pest management principles must be included and addressed appropriately.
  - the construction of small physical infrastructure Renovation and/or Refurbishing Construction Works, will adopt the specific measures included in the ESMF.

In case of approved projects, ESC shall be responsible for preparing two types of environmental and social documents. One of these documents shall be prepared for the compliance of provincial environmental requirements and submitted to respective provincial Environmental Protection Agency (EPA) for acquiring No Objection Certificate (NOC) and other types of documents shall be prepared for the compliance of safeguard

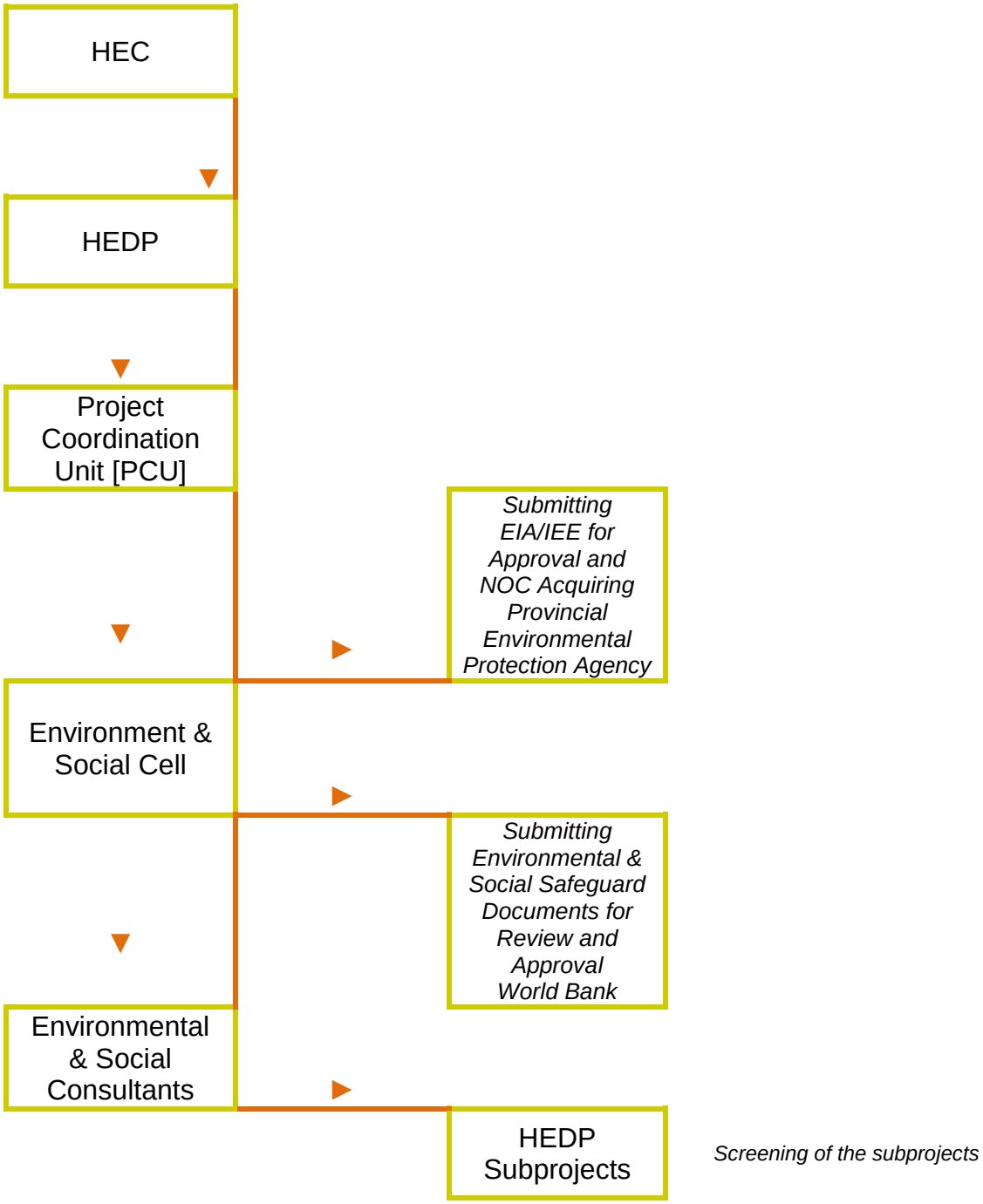
requirements of World Bank and submitted to World Bank Safeguard Staff for review, approval and for further action.

The ESC is suggested to keep a record of project activities and clearly document associated roles and responsibilities and the project timeline. A sample project tracking format is given as Table 3.

Table 3: ESC Project Tracking Format

Project Intervention	Project Phase	Environmental and social due diligence	Timeline	Responsibility
Small works	Preparation	Be very exhaustive in what needs to be done so this can be an input to the project's operational manual.		ESC, Contractors, Recipient or project proponents, EPAs etc.
	Construction/ Operation	As above		As above
Research Grants	Preparation of call of proposals	As above		As above
	Eligibility / selecting of projects	As above		As above
	Implementation supervision of projects	As above		As above

Figure 1: HEDP Institutional Arrangement



2.5 Project Monitoring

Monitoring of the ESMP is required at construction phase (if construction is involved) and operational phase of the project components. The monitoring is the requisite for

World Bank and Provincial Environmental Protection Agency (EPA). The monitoring framework is illustrated in Figure 2.

2.5.1 Planning and Selection Phase Monitoring

Planning and Selection phase monitoring of the project components shall be required for the compliance of ESMP as well as other specific environmental and social measures.

a) *Project Coordination Unit*: The overall responsibility of compliance of with the project's environmental and social requirements and arrangements as well as compliance reporting to World Bank and provincial EPA is with HEC. The Project Coordination Unit (PCU), established under HEC for the management of HEDP project activities, shall overall supervise the monitoring and compliance of EMP.

Environmental and Social Cell (ESC): The Environment and Social Cell (ESC) under PCU shall overall take care of environmental and social aspects of the project activities. ESC will be in charge of the screening of the research proposals. ESC will also advice project proponents on how to meet the environmental and social standards under the different financing windows with the project. ESC will advise the selection process of the proposals to confirm that they meet the environmental and social criteria established by this ESMF. ESC will also screen the proposals requesting funds to finance small works and will confirm that these meet the eligibility criteria from an environmental point of view. ESC will provide the template to prepare CESMP for contractors.

2.5.2 Implementation Phase Monitoring

The overall responsibility of compliance related to the implementation of environmental and social requirements as well as compliance is with HEC.

b) *Project Coordination Unit*: Project Coordination Unit (PCU) shall overall monitor the implementation of safeguards related aspects in project activities. ESC shall arrange environmental monitoring and prepare compliance reports and submit to PCU for further submitting to the World Bank to fulfill its monitoring, reporting, and compliance requirement of environmental and social safeguard. In case of small construction projects, the Construction Phase Environmental Management Plan (CPEMP) shall be prepared and appended with the tender document for the contractors. It will be a standard document. The contractors should be required to prepare their own site specific EMPs. These EMPs shall contain following plans to eliminate, offset or reduce environmental, health and safety impacts during construction phase:

- ❑ Sanitation plan
- ❑ Soil pollution control plan
- ❑ Dust control plan
- ❑ Waste management plan
- ❑ Health and safety plan
- ❑ Noise abatement plan
- ❑ Traffic management plan
- ❑ Campsite restoration plan

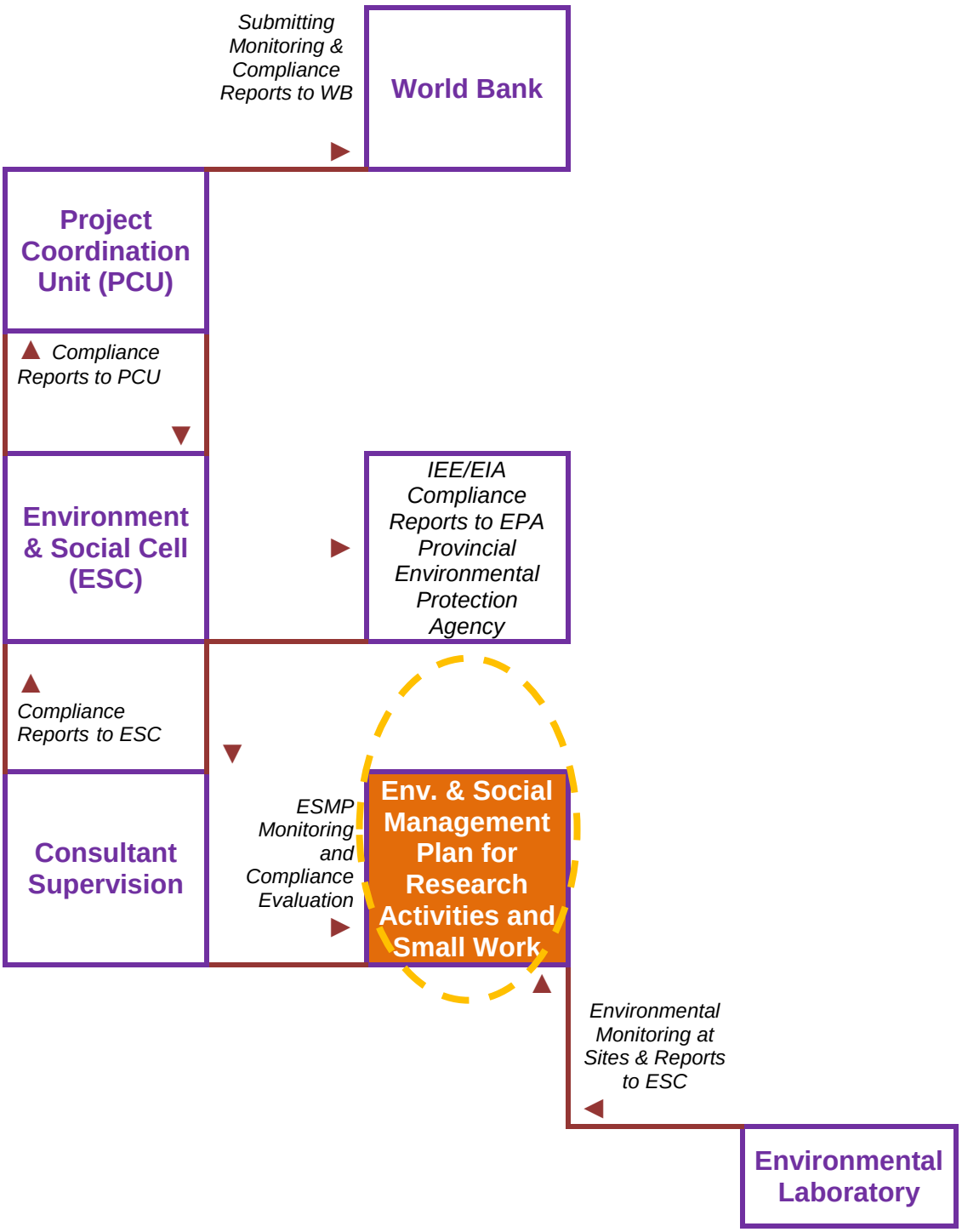
- ❑ Tree plantation plan

a) The compliance of CPEMP shall be the responsibility of the contractor and compliance cost shall be added in the bidding documents. The ESC shall have the responsibility to ensure compliance of CPEMP during construction phase through contractors. The compliance would require measurements of environmental parameters and observations at the construction sites to evaluate compliance. The compliance reports shall be submitted by the respective project executer to the ESC of the PCU. The laboratory reports shall be the part of these compliance reports. The respective project executer shall take corrective actions and preventive measures in case of any nonconformity against the ESMP. These corrective and preventive measures and rectification shall also be the part of the compliance reports. The PCU shall submit the compliance reports to World Bank

b) *Environmental Laboratory*: The PCU shall have the leverage to hire the services of competent environmental laboratory to monitor environmental parameters during project execution.

.

Figure 2: HEDP ESMF Supervision and Monitoring Arrangement



2.6 Analysis of Project Alternatives

2.6.1 No Project Option

Without this project, Pakistan would continue to be lacking in fundamental and applied research relevant to its social, environmental, economic, and technology issues. The most important reasons behind this lacking are education and research institutions capacity and lack of funds. Demand for the improvement in the education and research institutions has become essential in the light of cropping up of both immediate and long term manmade and natural issues faced by the country. Pakistan is one of the most flood-prone countries in the South Asia Region (SAR); having suffered US$18 billion in losses between 2005 and 2014 (US$10.5 billion from the 2010 floods alone), equivalent to around 6 percent of the federal budget.[7] Hydromet hazards have been coupled with rapid population growth and uncontrolled urbanization, leading to a disproportionate and growing impact on the poor. The frequency and quantity of precipitation in Pakistan is becoming increasingly unpredictable. The severity of these hazards is likely to be exacerbated due to climate change. By 2030, annual average flood damages are projected to increase five-fold relative to 2010.[8] In addition, these extreme weather events create vulnerabilities in major natural asset-based sectors.

In view of the vulnerability of the country to multiple social, economic, environmental, technology development, and disasters and climate-related risks, strengthening of education and research institutions in Pakistan is considered strategic in assisting the Government to achieve its national goals and global commitments, especially the Five-Year Development Plan of the Government of Pakistan (GoP), SDGs, Nationally Determined Contributions (NDCs) and the Sendai Framework for Disaster Risk Reduction (SFDRR) which among many other things, emphasize upon disaster-specific resilience in light of risk-informed development. The Project, by enhancing the capacity of HEC and its affiliated universities and colleges is likely to contribute in establishing the foundation for the sustainable development of the country.

2.6.2 Project Research Sites Alternatives

It is anticipated that the major focus of the researches to be conducted under the project will be applied in nature. Owing to this factor, alternative research sites are considered when the project location is sensitive to environmental and/or social impacts associated either to the nature of the research, involved physical works, and due to the operations of the research project sites. At present, the type and nature of research projects is not known. An analysis of alternative locations for sub-projects locations will be provided in the ESMPs prepared for each specific research project. In order to mitigate and avoid adverse environmental impacts, no project site shall be selected and funded under the program that is likely to:

- Generate irreversible environmental impacts on affected parties and third parties;
- Impact on the natural habitat;
- Impact on physical and cultural resources; or

[7] World Bank (2015) Fiscal Disaster Risk Assessment Options for Consideration: Pakistan. Chapter 1, page 2. https://openknowledge.worldbank.org/handle/10986/21920

[8] http://floods.wri.org/#/country/170/Pakistan

- Cause serious occupational or health risks.

This notwithstanding, it is explicitly stated that no project site will selected and research will be financed by the program that could be anticipated to lead to or aggravate social conflict between or within communities. To further mitigate and avoid adverse social impacts, no investment shall be funded under the program that:

- Requires physical displacement of households;
- Is likely to create or exacerbate conflict within communities;
- Have significant impacts on vulnerable and/or marginalized/indigenous groups.

When undertaking the appraisal of potential research projects, these aspects of environmental and social impacts shall be considered explicitly and, if recommended for implementation, it shall be stated that none of the above prohibiting factors applies.

3 REGULATORY REVIEW

This chapter briefly describes the national and World Bank laws, policies, strategies, guidelines, codes and procedures for the categorization, screening, environmental assessment and environmental compliance of the proposed project/subprojects which are intended to be financed by World Bank. The project should comply all the relevant national, provincial, local government laws and World Bank guidelines to provide legitimacy to the project implementation and operations and to ensure that environmental and social impacts at the project and sub-project levels are minimized and mitigated

3.1 National Laws, Policies and Strategies

This section briefly describes applicable laws, policies and strategies of the Government of Pakistan relevant for the research projects at the national sub-national levels. Following policies are relevant to the project and linked sub-projects with respect to environmental guidelines and identification of environment and social issues and accordingly researches need to be conducted for specific issues:

1. **National Policies:**

    - Climate Change Policy of Pakistan 2012
    - National Environmental Policy, 2005

2. **National and Provincial Legislation:**

    - Environmental Protection Act 1997
    - Provincial Environmental Protection Acts of Punjab, Sindh, Khyber Pukhtun Khwa, and Baluchistan
    - Pakistan Climate Change Act 2016
    - Forest Protection Laws and Rules
    - The Canal and Drainage Act 1873
    - Pakistan Penal Code
    - The Antiquities Act, 1975
    - The Public Health (Emergency Provision) Act 1954 read with West Pakistan Epidemic Control Act 1958
    - Building Code of Pakistan (Seismic Provisions-2007)
    - Provincial Local Government Ordinances, 2001
    - Land Acquisition Act 1894
    - Agricultural Pesticide Ordinance, 1971
    - Pakistan Biosafety Rules 2005
    - Factories Act 1934

3.1.1 Relevant National Policies

These policies provides an overarching common framework for addressing the environmental issues facing Pakistan, particularly adaptation and mitigation of climate change impacts, pollution of fresh water bodies and coastal waters, air pollution, lack of proper waste management, deforestation, loss of biodiversity, desertification, natural

disasters and climate change. These policies also give directions for addressing the cross sectoral issues as well as the underlying causes of environmental degradation and meeting international obligations. Effectiveness of the implementation of these policies varies. However, these policies identify many issues on which research should be done.

Climate Change Policy of Pakistan 2012: Pakistan being one of the top 10 most affected countries of climate change requires applied and fundamental researches in the areas of climate change mitigations and adaptation. Climate Change Policy 2012 and Climate Change Act 2016 are the basic policy and regulatory instruments in the hands of government of Pakistan to facilitate the implementation of mitigations and adaptations relevant to Pakistan. Climate Change Policy (CCP) establishes that urban and rural areas in Pakistan are already affected by short-term climate changes. In the long term, it is predicted that areas located in the irrigated plains and along the coast will be significantly affected by climate changes. It is predicted that due to climate changes, changes in hydrological cycle (intensive and erratic monsoon rains, flash floods, increased availability of water due to increased melting of glaciers in the short term; and decrease in water availability in the long term due to decrease in glacier flows) and increase in temperature will affect different parts of Pakistan. 50 cyclonic storms developed in the northern Arabia Sea during 1946-2004.

CCP predicts that due to climate change, extreme weather events such as heat and cold waves, heavy or too little precipitation, and strong winds will occur more frequently and will cause health impacts, for example, diarrheal diseases because of insufficient clean water availability for drinking and personal hygiene. It is predicted that vector-borne diseases such as malaria and dengue fever may increase. Similarly, extreme weather events will express themselves in the form of natural disasters such as floods, droughts, landslides, and urban flooding. CCP recommends the following strategic actions for conducting applied research:

- Framework for the development of city-specific strategic plans, including drainage of rainwater,
- Measures and technologies for water resource management (surface and sub-surface) at the national, sub-national, and local level,
- Technologies for wastewater treatment and reuse,
- Mitigations and adaptations for flood protection,
- Climate change impacts on public health, mitigations and adaptations,
- Disaster management system, and
- Strengthen early warning systems,

National Environmental Policy, 2005: Major research areas identified by National Environmental policy are:

Water Supply and Management

- Develop and promote appropriate technologies for rain water harvesting in rural as well as urban areas

- ❑ Establishment of water consumption standards by water use and accordingly develop technologies for water conservation.

Air Quality and Noise

- ❑ Develop technologies for air pollution abatement and control

Waste Management

- ❑ Develop discharge licensing system for industry
- ❑ Develop methods and techniques for encouraging reduction, recycling and reuse of municipal and industrial solid and liquid wastes
- ❑ Develop financial and other incentives (reduction/elimination of tariffs, low interest loans, appreciation certificates and awards) for technology up-gradation, adoption of cleaner technology, implementation of pollution control measures and compliance with environmental standards

3.1.2 Relevant National and Provincial Legislation:

Environmental Protection Act: The Pakistan Environmental Protection Act 1997 (PEPA-97) is the apex environmental law in the country, and provides for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and for promotion of sustainable development.

After the 18th amendment in 2010, the power to legislate and decide on the subject of "environmental pollution and ecology" now lies with the provincial government, however, "climate change" remains under federal jurisdiction.

Environmental protection acts relevant to all the anticipated projects or subprojects include following:

1. Pakistan Environmental Protection Act 1997 (For Islamabad and Federally Administered Tribal Areas)
2. Punjab Environmental Punjab Act (Amendment 2012)
3. Sindh Environmental Protection Act 2014
4. Balochistan Environmental Protection Act 2013
5. KPK Environmental Protection Act 2014

All the sub-projects of the project will go through environmental assessment screening i.e. IEE/EIA at the proposal stage and later during commissioning and implementation stages. In addition, wherever emissions will be generated these need to be complied with the Environmental Standards. Compliance with environmental protection acts is one of the essential requirement.

Pakistan Climate Change Act 2016: Pakistan Climate Change Council has been established under the chairmanship of the Prime Minister. The Council coordinates and supervises the enforcement of the provisions of the Act, monitor implementation of the

international agreements relating to climate change, approve and monitor implementation of comprehensive adaptation and mitigation policies, strategies, plans, programs, projects and other measures formulated by the authority to meet Pakistan's international obligations, monitor the implementation of National Adaptation Plan and its constituent provincial and local adaptation action plans, approve guidelines for the protection and conservation of renewable and non- renewable resources, species, habitats and biodiversity adversely affected or threatened by climate change.

The Minister In-charge of the Federal Government shall establish the Pakistan Climate Change Authority to exercise the powers and perform the functions under the Act. The functions of the authority shall be to formulate comprehensive adaptation and mitigation policies, plans, programs, projects and measures designed to address the effects of climate change, establish institutional and policy mechanism for implementation of Federal and provincial adaptation and mitigation policies, plans, programs, projects and measures, prepare suitable adaptation and mitigation projects for submission to international and local institutions for funding, including Clean Development Mechanism (CDM), Global Environmental Facility (GEF), Green Climate Fund and Adaptation Fund, prepare National Adaptation Plan and its constituents provincial and local adaptation plans, carry out Technology Need Assessment and prepare Climate Change Technology Action Plan in accordance with international best practices, prepare projects for funding under the Reducing Emissions from Deforestation and Forest Degradation (REDD) Mechanism, prepare guidelines for the protection and conservation of renewable and non-renewable resources, species, habitats and biodiversity which are adversely affected or threatened by climate change, advise Government regarding appropriate legislative, policy and implementation measures and actions relating to disaster preparedness, capacity building, institutional strengthening and awareness raising in relevant sectors affected by climate change, advise the Government regarding implementation of international conventions, design, establish and maintain a national registry and database on greenhouse gas emissions etc.

Climate Change Act demands research support in many areas for its effective implementation. The project during the identification of research areas can facilitate universities to select strategic research areas relevant to the Climate Change Act 2016 in coordination with Ministry of Climate Change.

Forest Protection Laws and Rules: Since the project interventions will be carried out in four provinces including capital territories, the laws and rules relevant for the protection and conservation of forest, fisheries and wildlife in the country are listed below. However at present the location of research projects with respect to designated forest zones is not known. The provincial and national regulations will only be applicable if research projects will be conducted in the designated forest zones.

1. The Forest Act 1927 Amended 2016
2. Hazara Forest Act, 1936.
3. KPK Forest Ordinance 2002
4. Sindh Forest Act 2012

5. Balochistan Forest and Wildlife Act 2014
6. Punjab Firewood and Charcoal (Restriction) Act 1964
7. Punjab Forest (Sale of Timber) Act 1913
8. Punjab Plantation and Maintenance of Trees Act 1974
9. Punjab Land Preservation Act

The Canal and Drainage Act 1873: The Canal and Drainage Act 1873 (CDA) focuses on construction and maintenance of drainage channels and defines powers to prohibit obstruction or order their removal. It briefly addresses issues relating to environmental pollution. Section 70(5) of the CDA clearly states that no one is allowed to "corrupt or foul the water of any canal so as to render it less fit for the purposes for which it is ordinarily used." In addition, Section 73 of the CDA gives power to arrest without warrant or to be taken before the magistrate a person who has willfully damaged or obstructed the canal or "rendered it less useful." Pakistan has a canal irrigation system for agriculture and there are 5 agriculture universities which are associated with HEC. Any project related to or proposed from these universities, their affiliated colleges or involving canal water and drainage should comply the requirements of this Canal and Drainage Act 1873.

Pakistan Penal Code: The Penal Code discusses offences where public or private properties and/or human lives are affected due to intentional or accidental misconduct of an individual or body of people. The Code defines the penalties for violations concerning pollution of air, water bodies and land. In the context of this program, the Penal Code can provide a basis for the infrastructure projects to coordinate activities with the local authorities to ensure that construction and operation activities do not become a cause of public nuisance or inconvenience.

The Antiquities Act, 1975: This Act defines how to repeal and reenact the law relating to the preservation and protection of antiquities. The federal government may, by notification in the official Gazette, declare any antiquity to be a protected antiquity for the purposes of this Act. A contravention of any provision of this Act or the rules shall, where no punishment has been specification provided, be punishable with rigorous imprisonment for a term which may extend to six months or with a fine which may extend to PKR 5,000, or with both.

The Public Health (Emergency Provision) Act 1954 read with West Pakistan Epidemic Control Act 1958: These two laws cover the presentation and spread of human diseases, safeguarding the public health and providing and maintaining adequate medical services and other services essential to the health of the communities in the project research areas. These laws become highly relevant to the biological researches and their linked public health issues. These laws need to be essential complied while preparing and conducting field and laboratory researches.

Building Code of Pakistan (Seismic Provisions-2007): The project activities include renovation and construction of a few new buildings. The Pakistan Engineering Council governs the application of Building Code of Pakistan (Seismic Provisions-2007). Prior to the start of construction the proposed sub project will take design approval from PEC. The obligates following;

- The provisions of the Building Code of Pakistan (Seismic Provisions-2007) shall apply for engineering design of buildings, like structures and related components.
- Construction of buildings in violation of the Building Code shall be considered as violation of professional engineering work as specified under clause (XXV) of section 2 of the Act.

  The project activities will comply with the seismic provision during building design.

Provincial Local Government Ordinances, 2001: These ordinances, issued following the devolution process, establish regulations for land use, the conservation of natural vegetation, air, water, and land pollution, the disposal of solid waste and wastewater effluents, as well as matters related to public health and safety. These ordinances are highly relevant to all the field research projects and building development activities of the project. Local governments of Pakistan are facing serious capacity issues for the implementation of their mandates. Variety of researches are required in the areas of improvement methods and models for local level governance, waste management (wastewater, solid waste, soil contamination etc.) and public health. The project in collaboration with local governments can conduct multiple applied researches to solve the governance, infrastructure, environmental and social issues.

Land Acquisition Act 1894: It is mentioned in the Project Description Section that the project will not be involved in the construction of new buildings at new locations and consequently no acquisition of land will be involved in the project. It is also the understanding that the project will not acquire land for any field research. The field research will only be conducted in the already designated farms such as PARC and NARC research farms for agriculture research.

Agriculture Pesticide Ordinance 1971: The project activities include research work related to agriculture. The import, manufacture, formulation, sale, distribution and use of pesticides is controlled by the Agricultural Pesticide Ordinance, 1971, through the Agricultural Pesticides Rules, 1973. The ordinance covers:

- Pesticide registration
- Period for which registration shall be effective, renewal or cancellation of registration
- guidance for import, proper labelling of packages, storage and use of pesticides
- quality check through public analyst at Federal/Provincial Pesticide laboratories
- appointment of inspectors to monitor pesticides
- penalties for defaulters
- laws relating to the above mentioned aspects

The list of banned pesticides is attached as Annexure 5.

Pakistan Biosafety Rules 2005: The project activities which include research work involving microorganism and gene technological products will be following Pakistan biosafety rules 2005. The rules are applied following the National Biosafety Guidelines 2005. These guidelines have been prepared keeping in view the guidelines prepared by UNIDO, FAO, WHO, UNEP, and all the developed and developing countries with modification to suit our unique and specific socio-economic and geographic environment. The objective of these guidelines is to prevent unintentional negligence leading to misuse and irresponsibility by laboratory workers/researchers as well as the end users.

Factories Act 1934: The project activities needs focus on occupational health and safety aspects for all the staff carrying out their specific responsibilities. The factories act 1934 provides concerns about health & safety as well as about inspection, working hours, holidays with pay, and special provisions for adolescents and children. The act is now amended to fulfill the provincial needs as the Punjab factories act 2012, the Khyber Pakhtun Khwa factories act 2013 and the Sind factories act 2015. The project activities will be following the relevant applicable legal requirements in this case.

3.2 World Bank Safeguard Policies

Table 4 presents the World Bank's environmental and social policies, consisting of 11 Operational Policies[9] and the bank's disclosure policy, and also describes their relevance to HEDP project.

The project and sub-projects will not conduct following activities:

- Disturbance to the natural habitats
- Disturbance to the indigenous people
- Disturbance to physical and cultural resources
- Land acquisition
-

Table 4: Safeguard Policies Applicability

No.	Operational Policies	Brief Description	HEDP Relevance
1	Environmental Assessment [OP 4.01]	To help ensure the environmental and social soundness and sustainability of investment projects.	Yes
2	Performance Standards for Private Sector Activities [OP 4.03]	To facilitate Bank financing for private sector led economic development projects by applying environmental and social policy standards that are better suited to the private sector, while enhancing greater policy coherence and	No relevance is anticipated. The project will not fund proposals involving activities initiated by the private sector.

[9] https://www.worldbank.org/en/projects-operations/environmental-and-social-policies

		cooperation across the World Bank Group.	
3	Natural Habitats [OP 4.04]	To promote environmentally sustainable development by supporting the protection, conservation, maintenance, and rehabilitation of natural habitats and their functions.	No direct relevance is anticipated. The project will not fund proposals involving activities related to natural habitats.
4	Pest Management [OP 4.09]	To minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective, and environmentally sound pest management.	Yes, as project interventions are likely to be carried for agriculture sector. These researches and interventions might require pest management.
5	Indigenous Peoples [OP 4.10]	To design and implement projects in a way that fosters full respect for Indigenous Peoples' dignity, human rights, and cultural uniqueness and so that they: (a) receive culturally compatible social and economic benefits; and (b) do not suffer adverse effects during the development process.	The Policy is triggered as a precaution. The project does not specifically have research targets for the IP in Pakistan, but there can be a research idea focusing on them. However, the Project will not finance any physical intervention on IP in any IP areas.
6	Physical Cultural Resources [OP 4.11]	To assist in preserving physical cultural resources and avoiding their destruction or damage. PCR includes resources of archaeological, paleontological, historical, architectural, religious (including graveyards and burial sites), aesthetic, or other cultural significance.	No relevance is anticipated. The project will not fund proposals involving activities related to physical cultural resources.
7	Involuntary Resettlement [OP 4.12]	To avoid or minimize involuntary resettlement and, where this is not feasible, to assist displaced persons in improving or at least restoring their livelihoods and standards of living in real terms relative to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.	No relevance is anticipated. The project will not fund proposals involving activities related to involuntary resettlement.
8	Forests [OP 4.36]	To realize the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.	Yes, as proposed project and sub-projects may be located near or inside the protected forest.
9	Safety of Dams [OP 4.37]	To assure quality and safety in the design and construction of new dams and the rehabilitation of existing dams, and in carrying out activities that may be affected by an existing dam.	No direct relevance is anticipated. The project will not fund proposals involving activities related to safety of dams

10	Projects in Disputed Areas [OP 7.60]	To assure that a project in a disputed area if the governments concerned agree that, pending the settlement of the dispute, the project proposed for country A should go forward without prejudice to the claims of country B.	No direct relevance is anticipated. The project will not fund proposals involving activities related to projects in disputed areas.
11	Projects on International Waterways [OP 7.50]	To ensure that the international aspects of a project on an international waterway are dealt with at the earliest possible opportunity.	No direct relevance is anticipated. The project will not fund proposals involving activities related to projects on international waterways.
12	Bank Disclosure Policy	Under the policy, the Bank would provide access to more information about projects under preparation, projects under implementation, analytic and advisory activities and Board proceedings	Yes

3.2.1 OP/BP 4.01 Environmental Assessment

This policy requires environmental assessment (EA) of projects proposed for World Bank financing to help ensure that these are environmentally sound and sustainable, and thus to improve decision making. The EA is a process whose breadth, depth, and type of analysis depend on the nature, scale, and potential environmental impact of the proposed project. EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

The EA takes into account the natural environment (air, water, and land); human health and safety; social aspects (including physical cultural resources) and trans-boundary and global environmental aspects. EA considers natural and social aspects in an integrated way. It also takes into account the variations in project and country conditions; the findings of country environmental studies; national environmental action plans; the country's overall policy framework, national legislation, and institutional capabilities related to the environment and social aspects; and obligations of the country, pertaining to project activities, under relevant international environmental treaties and agreements. The EA is initiated as early as possible in project processing and is integrated closely with the economic, financial, institutional, social, and technical analyses of a proposed project.

As per the policy, the Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of the environmental assessment. The Bank classifies the proposed projects into one of four categories of A, B, C and FI depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts.

3.2.2 OP/BP 4.09 Pest Management

In assisting HECs to manage pests that affect either agriculture or public health, the Bank supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. In Bank-financed projects, the HEC addresses pest management issues in the context of the project's environmental assessment.

In appraising a project that will involve pest management, the Bank assesses the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management. As necessary, the Bank and the HEC incorporate in the project components to strengthen such capacity.

The HEC must adhere to integrated pest management principles for the research activities using or promoting the use of pesticides.

3.2.3 OP/BP 4.10 Indigenous People

For purposes of the World Bank Operational Policy on Indigenous Peoples (OP 4.10), the term "Indigenous Peoples" is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- Self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- An indigenous language, often different from the official language of the country or region.

The OP requires the project to define the process to be followed (detailed in the Indigenous Peoples Planning Framework) if it affects the indigenous people. Since there are identified indigenous people in Kalash valley in northern Pakistan (Chitral district of Khyber Pakhtunkhwa), this OP is triggered as a precaution.

Since the Local Challenge Fund under Component 1 will provide grants for research to tackle pressing socioeconomic challenges within any given district or locality that the university is located in. The grant will be open to research addressing any of the seventeen Sustainable Development Goal targets, with a focus on adapting solution to the local district/division level in Pakistan. Since the fund is competitive and open to all universities (including the University of Chitral), there is a possibility that grant applications may be received for research focusing on Kailash people, valleys or land. Keeping that in mind, OP 4.10 is triggered as a precaution. All such requests will need to be vetted by the World Bank (under guidance of OP 4.10) and will be required to acquire all necessary and relevant clearances from the Bank. This due diligence will be carried out before initiating any type of review process by any entity. An IPPF has been prepared and disclosed for HEDP.

3.2.4 OP/BP 4.36 Forests

The management, conservation, and sustainable development of forest ecosystems and their associated resources are essential for lasting poverty reduction and sustainable development, whether located in countries with abundant forests or in those with depleted or naturally limited forest resources. The objective of this policy is to assist HECs to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.

Where forest restoration and plantation development are necessary to meet these objectives, the Bank assists HECs with forest restoration activities that maintain or enhance biodiversity and ecosystem functionality. The Bank also assists HECs with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services.

This policy applies to the following types of Bank-financed investment projects:

- ❑ Projects that have or may have impacts on the health and quality of forests;
- ❑ Projects that affect the rights and welfare of people and their level of dependence upon or interaction with forests; and
- ❑ Projects that aim to bring about changes in the management, protection, or utilization of natural forests or plantations, whether they are publicly, privately, or communally owned.

3.2.5 BP 17.50 World Bank Disclosure Policy

The World Bank reaffirms its recognition and endorsement of the fundamental importance of transparency and accountability to the development process. Accordingly, it is the Bank's policy to be open about its activities and to welcome and seek out opportunities to explain its work to the widest possible audience. The WB Disclosure Policy will be applicable for this project. Under the policy, the Bank would provide access to more information about projects under preparation, projects under implementation, analytic and advisory activities and Board proceedings.

3.3 World Bank Guidelines

The principal World Bank publications that contain environmental and social guidelines are listed below.

- ❑ Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- ❑ Environmental Assessment Sourcebook, Volume I: Policies, Procedures, and Cross-Sectoral Issues.
- ❑ Social Analysis Sourcebook.

3.4 International Conventions/Agreements

The following Table 5 shows the international conventions to which Pakistan is a signatory are relevant to project interventions:

Table 5: International Conventions

Category	Convention/convention	Came into force
Chemicals and hazardous wastes conventions	Stockholm Convention on Persistent Organic Pollutants	April 2008
	Rotterdam Convention on the Prior Informed Consent procedures for Certain Hazardous Chemicals and Pesticides in International Trade.	July 2005
	Basel Convention on the control of Trans-boundary Movement of Hazardous Wastes and their Disposal.	July 1994
Atmosphere conventions/protocols	United Nations Framework Convention on Climate Change (UNFCCC)	June 1994
	Kyoto Protocol to UNFCCC	Jan 2005
	Vienna Convention for the protection of the Ozone Layer.	Dec1992
	Montreal Protocol on Substances that Deplete the Ozone Layer.	Dec 1992
Land / environmental cooperation conventions	United Nations Convention to Combat Desertification (UNCCD) in those Countries Experiencing Serious Drought and / or Desertification, Particularly in Africa.	Feb 1997
Cultural and natural heritage	Convention Concerning the Protection of World Cultural and Natural Heritage (World Heritage Convention)	July 1976
Biodiversity related conventions/protocols	Convention on Biological Diversity (CBD).	July 1994
	Cartagena Protocol on Bio-safety to the Convention on Biological Diversity.	March 2009
	Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)	Nov 1976
	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).	April 1976
	Convention on the Conservation of Migratory Species of Wild Animals (CMS)	Dec 1987

4 Environmental and Social Baseline: Environmental Challenges relevant to the Project's Strategic Sectors

4.1 Baseline for small works at institutes

As part of the support to Decentralized Higher Education Institutes for improved teaching and learning, the project includes a grant scheme devoted to the betterment of the physical facilities where the teaching is taking place. These small works will happen within buildings where the teaching activities usually take place, including the presence of students, teachers, and visitors.

4.2 Main features of the priority sectors for research activities

Pakistan's economic growth and development has come with extraordinary environmental costs. Natural resource and environmental degradation reduces the pace of growth and the quality of life[10]. The cost of environmental degradation in Pakistan is Rs. 365 billion per year or 6 percent of the GDP, mainly due to (i) illness and premature mortality caused by air pollution (indoor and outdoor), (almost 50 percent of the total damage cost); (ii) diarrhoeal diseases and typhoid due to inadequate water supply, sanitation and hygiene (about 30 percent of the total), and (iii) reduced agricultural productivity due to soil degradation (about 20 percent of the total) (World Bank, 2006)[11].

In the physical domain, the major threat is posed by climate change, associated with increased frequency and intensity of floods and hurricanes, prolonged droughts and growing water stress, shift of disease vectors, and the frightening possibility of the melting of the Himalayan icecaps[12].

Major environmental challenges of the key strategic sectors, identified by the project are as under:

4.2.1 Energy

In Pakistan, primary energy sources are mainly thermal (64%), hydropower (27%), nuclear power (7%) and renewable energy (2%)[13]. With regards to share of different sources of electricity generation, it can be observed that share of hydro in electricity generation has decreased over the last five years (Table 6), mainly due to lower availability of water. Presently the share of renewable sources to energy supply in Pakistan is only 2% but future prospects of renewable energy are encouraging in Pakistan

[10] The World Bank 2018. PAKISTAN PK@100 - Shaping the Future Environmental Sustainability. World Bank, Islamabad

11 World Bank. 2006. Pakistan - Strategic country environmental assessment (Vol. 2) : The cost of environmental degradation in Pakistan : an analysis of physical and monetary losses in environmental health and natural resources (English). Washington, DC: World Bank.

12 Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk

13 The Ministry of Energy (Power Division). 2018. Available from http://www.finance.gov.pk/survey/chapters_18/14-Energy.pdf.

with a total potential of about 167.7 GW which is more than enough to meet the total electricity demand of the country (Rafique & Rehman, 2017)[14].

Table 6: Share of Different Sources of Energy

Source	Share of Different Sources (percentage)	
	2012-13	2017-18
Thermal	64	64
Hydropower	31	27
Nuclear	5	7
Renewable energy	0	2

Source: Government of Pakistan's Ministry of Energy (Power Division)

Presently the share of renewable sources to energy supply in Pakistan is only 2% but future prospects of renewable energy are encouraging in Pakistan with a total potential of about 167.7 GW which is more than enough to meet the total electricity demand of the country (Rafique & Rehman, 2017)[15].

Presently the high dependence on fossil fuels is the biggest challenge of energy sector in Pakistan, which is 64% of all the available energy sources [16], posing serious environmental challenges. The fossil fuel-based power generation in the country is projected to further grow. Coal fired power plants of cumulative capacity of 4,290 MW from indigenous coal and 5,201 MW from imported coal are under different stages of construction[17].

Coal technologies are the most polluting (GHGs and classic pollutants) because of their carbon dioxide content. Old and current coal-fired plants are also significantly more polluting in terms of SO_2, NO_x and CO). For the US, the environmental protection agency (EPA) identifies 2,249 pounds of average emission levels in the production of 1 MWh of electricity by coal. Due to lax enforcement as well as inadequate environmental regulation, in Pakistan emission levels are much higher. However, Pakistan does not have estimates of external cost for local conditions and technologies in use for competitive fuels. What we do know is that the emission of SO_2, NOx, CO, and PM_{10} is significantly higher than that of these pollutants in Europe or the US. So, the external cost in Pakistan will be higher[18].

The situation further exacerbates the challenges of energy-environment nexus, adversely impacting in terms of climatic changes, pollution and deforestation. Pakistan is an emerging economy. All the developments made through the current energy consumption patterns will increase the atmospheric concentrations of GHG and toxic pollutants and worsen the existing climate change vulnerabilities. External cost of power generation in

14 Rafique M. M. & Rehman, S. 2017. National energy scenario of Pakistan – Current status, future alternatives, and institutional infrastructure: An overview. 2017. Renewable and Sustainable Energy Reviews. 69, 156-167.
15 Rafique M. M. & Rehman, S. 2017. National energy scenario of Pakistan – Current status, future alternatives, and institutional infrastructure: An overview. 2017. Renewable and Sustainable Energy Reviews. 69, 156-167.
16 The Ministry of Energy Power Division. 2017-18
17 https://www.ips.org.pk/energy-environment-nexus-challenges-pakistan/
18 https://www.ips.org.pk/energy-environment-nexus-challenges-pakistan/

terms of unaccounted cost of environmental and health impacts are quite high. Major external costs of energy-related activities include air pollution, water pollution, negative health impacts and climatic changes[19].

Energy efficiency is very crucial for keeping a balance between energy, economic growth and environmental sustainability. For Pakistan, the measure of energy efficiency (in 2006) was 219 kilogram of oil equivalent (kgoe) per $1,000 GDP. For India, China, Brazil, UK, France, US, and Germany, the measures were 211, 317, 136, 116, 143, 183, and 131, respectively. The Chinese's successful effort to increase its energy efficiency from 690 kgoe per $1,000 GDP to 317 kgoe in 15 years can have important lessons for Pakistan (Hussain, 2010)[20].

4.2.2 Agriculture Development and Food Security

Pakistan's agriculture sector plays a central role in the economy as it contributes 18.9 percent to GDP and absorbs 42.3 percent of labour force. It is also an important source of foreign exchange earnings and stimulates growth in other sectors. During 2017-18, agriculture sector recorded a remarkable growth of 3.81 percent and surpassed its targeted growth of 3.5 percent and last year's growth of 2.07 percent. Livestock having share of 58.92 percent in agriculture and 11.11 percent in GDP, recorded a growth of 3.76 percent compared to 2.99 percent during corresponding period last year. The Fishing sector having share of 2.10 percent in agriculture value addition and 0.40 percent in GDP, grew at 1.63 percent compared to growth of 1.23 percent in same period last year. Forestry sector having share of 2.09 percent in agriculture and 0.39 percent in GDP posted a positive growth of 7.17 percent against the negative growth of 2.37 percent recorded in same period last year due to higher timber production reported by Khyber Pakhtunkhwa[21].

Agricultural performance in Pakistan has been poor in recent years with slow growth (3.1% in 2011- 12 and 3.3% over the last decade). Major factors underlying this poor performance include a slow rate of technological innovation, limited adoption of progressive farming techniques, problems with quality, quantity and timeliness of input supply, limited investment in construction and maintenance of infrastructure; marketing and trade restrictions, pest and livestock disease problems, and limited amounts of credit for agricultural production and processing and the lack of agriculture-specific financing[22].

Pakistan ranks among the bottom one-third of countries surveyed by the Global Food Security Index (77 out of 113), with marginal improvements over the past few years. The index highlights issues with food quality and safety, as well as challenges in R&D in the sector. Without reform and investment, high population growth coupled with low agricultural growth could lead to food availability concerns. There are projections of a

[19] Hussain, T. 2010. Pakistan's Energy Sector Issues: Energy Efficiency and Energy Environmental Links. The Lahore Journal of Economics 15, 33-59

[20] Hussain, T. 2010. Pakistan's Energy Sector Issues: Energy Efficiency and Energy Environmental Links. The Lahore Journal of Economics 15, 33-59

[21] http://www.finance.gov.pk/survey/chapters_18/02-Agriculture.pdf

[22] Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk

shortfall in grains of 5 million metric tons by 2030 (Kirby et al., 2017)[23]. The reasons have to do with inefficiencies in food distribution, low spending on agricultural R&D and inadequate food safety nets for those in severe poverty.

Once a wheat exporter, Pakistan is now in danger of failing to even meet domestic demand for wheat. Such a scenario is not sustainable given the country's growing population. It is estimated that half of the population of Pakistan experiences malnutrition. The prevalence of stunting (44%) among children aged less than five years has remained virtually unchanged since 1965. In Pakistan, 15% of children under age 5 suffer from acute malnutrition – the second-highest rate in the region. Similarly, a high percentage of the population is underweight or suffers from micronutrient deficiencies. Poverty and hunger is leading to extreme behavior and violence[24].

Agriculture related environmental challenges include excessive withdrawal of scarce freshwater resources, waterlogging and salinity, soil erosion and desertification, disintegration of agro-ecosystem with excessive use of chemicals and pesticides, human health ailments due to excessive use of hazardous chemical pesticides, GHG emissions and rangelands degradation. In Pakistan, about 11 million hectares are affected by water erosion and 3-5 million hectares by wind erosion. The amount of soil removed by wind is about 28 percent of total soil loss. Due to deforestation, forest cover is shrinking by 3.1percent and woody biomass by 5 percent annually (7000-9000 ha taken away annually). Free grazing of livestock, aridity and prolonged drought in arid lands have affected the biodiversity in various regions[25].

About 10 million tonnes of fertilizer and 144 thousand tonnes of pesticides are consumed in the country every year (2016-17)[26]. Pesticide use is increasing annually at a rate of about 6%. Pesticides, mostly insecticides, sprayed on the crops mix with the irrigation water, which leaches through the soil and enters groundwater aquifers. In 107 samples of groundwater collected from various locations in the country between 1988 and 2000, 31 samples were found to have contamination of pesticides beyond FAO/WHO safety limits[27].

Pakistan is predominantly an arid to semi-arid country with 68 million hectares of land lying in regions where the annual rainfall is less than 300 mm. One-fourth of the country's land area, which is suitable for intensive agriculture, is threatened by wind and water erosion, salinity, waterlogging, flooding and loss of organic matter. The important driving forces of land degradation in Pakistan are intensive agriculture, unsustainable cropping pattern, unchecked use of chemical fertilizers and pesticides, limited land resources and

[23] Kirby, M, Mobin-ud-Din Ahmad, Mohammed Mainuddin, Tasneem Khaliq, and M.J.M. Cheema, 2017. Agricultural Production, Water Use, and Food Availability in Pakistan: Histroical Trends and Projections to 20150. Agricultural Water Management 179, 34–46.

[24] Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk

[25] http://www.finance.gov.pk/survey/chapters_16/16_Environment.pdf

[26] National Fertilizer Development Centre, Ministry of Planning, Development & Reform.

[27] WWF Pakistan, 2007. Pakistan's waters at risk. Lahore, Pakistan

population increase[28]. Total agriculture-related emissions of Pakistan were 139Mt CO_2e in 2008[29].

There is serious deficit of pollinators in Pakistan, due to various reasons such as loss, destruction and degradation of habitats, excessive tillage, destruction of trees, extensive weeding, deforestation, reduced genetic diversity of nectar plants, pests and pathogens, climate change, extensive and intensive use of pesticides especially insecticides and herbicides[30]. The economic value of insect pollinators in Himalayan region of Pakistan is US$ 954.59 million[31]. Recently the production value of pollinated dependent crop in Pakistan was quantified to be US$ 1.59 billion. Of the total value, fruits are dominant with US$ 0.98 billion, vegetables US$ 0.32 billion, nuts US$ 0.15 billion, oilseed US$ 0.13 billion and spices US$ 0.004 billion[32] (Irshad and Stephen, 2013). There are 61 important pollinated crops used as food in Pakistan which include 26 fruit crops, 7 oilseed, 4 pulses, 19 vegetables, 2 spices and 3 nut trees.

4.2.3 Water Management and Use

Pakistan's rising water demands are mostly met by the Indus River System, supplying 180 billion cubic meters of water. The river system is sustained by glaciers in the Hindukush-Karakoram ranges, believed to be receding under influence of climate change and global warming. About 95% of the available water is withdrawn in agriculture/rural areas[33]. Pakistan's water scenarios is given in Table 7.

The country depends much on Indus Basin canal irrigation system, which is posed to serious operational, and maintenance issues. Huge water losses in transit through leakages, illegal pumping and inefficiency of the system adversely affect the small landholders and those at the tails of the distribution channels. The recurrence of droughts in certain areas and floods in recent years has further increased the number of food insecure people. These issues have reduced water use efficiency at farm level a major reason of low average yields of crops at national level. The irrigation water availability for 2016-17 has been assessed at 132.7 MAF against the targeted 134.56 MAF. Rain fall during early Rabi season remained low causing water shortages, affecting especially wheat sowing in rain fed areas[34].

Table 7: Pakistan's Water Scenarios

Water	Units	2004	2025
Availability	MAF	104	104
Requirement [Including Drinking Water]	MAF	115	135

[28] http://www.finance.gov.pk/survey/chapters_16/16_Environment.pdf
[29] https://www.ceaconsulting.com/wp-content/uploads/global-agriculture-and-enironmental-issues-landscape.pdf
[30] Irshad, M & Stephen, E. 2014. Review: Pollination, Pollinated and Pollinators Interaction in Pakistan. Journal of Bioresource Management, 1 (1), 19-25.
[31] Partap U, Partap T, Sharma HK, Phartiyal P, Marma A, Tamang NB, Ken T and Munawar MS (2012). Value of insect pollinators to Himalayan agricultural economies. Kathmandu, ICIMOD, p. 54.
[32] Irshad M and Stephen E (2013). Value of insect pollinators to agriculture of Pakistan Int. J. Agron. and Agric. Res., 3(5),14-21.
[33] Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk
[34] Planning Commission. 2017-18. https://www.pc.gov.pk/uploads/annual2017/Ch20Food%20Agriculture%20(Formatted).pdf

Overall Shortfall	MAF	11	31

With an estimated population of 227 million by 2025, Pakistan's current water availability of less than 1100 cubic meters per person, down from 5000 cubic meters in 1951 classifies it as a "water-stressed" country that is headed towards becoming a "water-scarce" country if actions are not taken urgently. Storage capacity is limited to a 30-day supply, well short of the recommended 1000 days for countries of a comparable climate. The supply demand gap is continuing to increase – compounded by the effects of climate change on snowmelt, reducing flows into the Indus River, the primary fresh-water source for the country[35].

The stress on water resources of the country is from multiple sources. Rapid urbanization, increased industrial activity and dependence of the agricultural sector on chemicals and fertilizers have led to water pollution. Deterioration in water quality and contamination of lakes, rivers and groundwater aquifers has, therefore, resulted in increased water borne diseases and negative impacts on human health[36].

Major sources of contamination of river water are natural drains passing through urban and industrial areas. The outflow of these drains contains highly contaminated industrial waste that becomes the part of Ravi and Chenab Rivers. Water carries the contaminants along its flow and there is a need of establishment of strict criterion to ensure effective contamination management in Rivers. Water contamination and poor water quality have a direct and very significant impact on the nation's health – with water borne infections accounting for 70% of all common diseases impacting the national health. Uncontrolled and unregulated pumping of subsurface water in sweet zones and urban areas is resulting in rapid loss of the sub-surface water table, expansion of brackish water zones and expansion of saline zones. Urban water supplies are wasteful, heavily reliant on expensive pumping, poorly managed, ill-priced and often unfit for human consumption[37].

According to Pakistan Council of Research in Water Resources (PCRWR), the majority of the population in the country is exposed to the hazards of drinking unsafe and polluted water from both surface and ground water sources. As derived from the National Water Quality Monitoring Programme carried out by the PCRWR, the 4 major contaminants in drinking water sources of Pakistan were bacteriological (68 percent), arsenic (24 percent), nitrate (13 percent) and fluoride (5 percent). It is estimated that around 40 percent of all reported diseases in Pakistan are attributed to poor water quality. As one indicator of the magnitude of the problem, it is estimated that 250,000 children in Pakistan die every year due to diarrheal diseases alone. Safe water alone can reduce diarrhea and other related diseases by up to 50 percent, but an estimated 62 percent of Pakistan's urban population and 84 percent of the rural population do not treat their water (USAID). Pakistan's ranking in maintaining water quality standards is 80th out of 122 nations. (UNESCO s' World Water Development Report)[38].

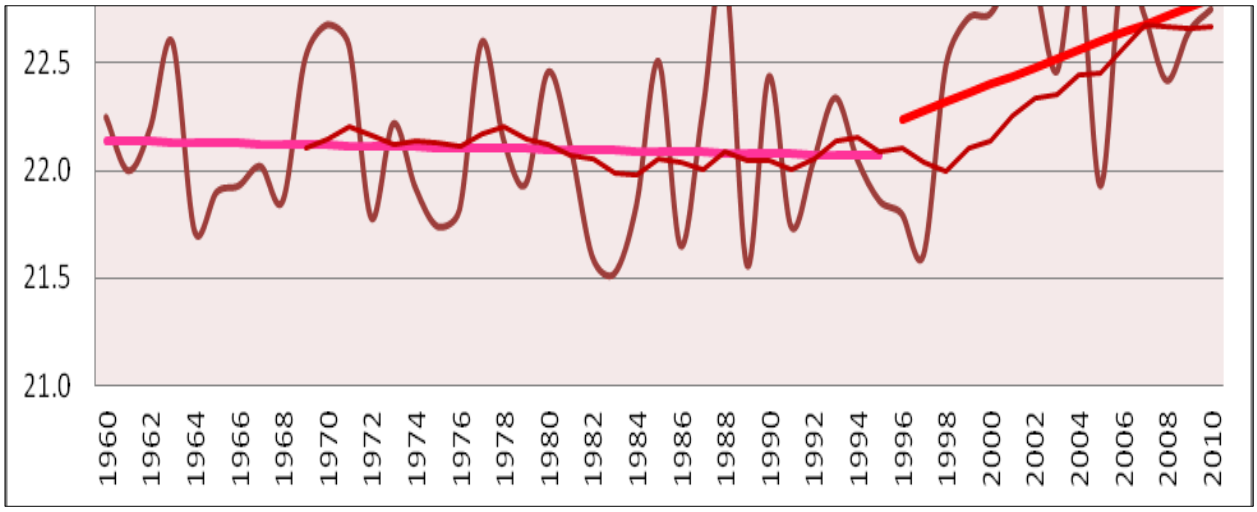
[35] Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk
[36] [36] WWF Pakistan, 2007. Pakistan's waters at risk. Lahore, Pakistan
[37] Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk
[38] http://www.finance.gov.pk/survey/chapters_16/16_Environment.pdf

The National Conservation Strategy of Pakistan states that almost 40 percent of all disease related deaths are connected to water borne diseases. Other sources of water pollution are industrial effluents, solid waste, hospital waste, chemical fertilizers and pesticides.

4.2.4 Climate change

The mean annual temperature over the country rose by 0.57°C through the 20th century, with a faster increase in the beginning of the 21st century[39]. Since 1960 up to 1997, there was inter-annual variability of mean daily temperatures subsequently featuring alternative cold and hot spells but amplitude of variations maintained the average pace. Figure 3 shows the Area Weighted Mean Temperatures of Pakistan (1960-2010).

Figure 3: Area Weighted Mean Temperatures of Pakistan (1960-2010)[40]



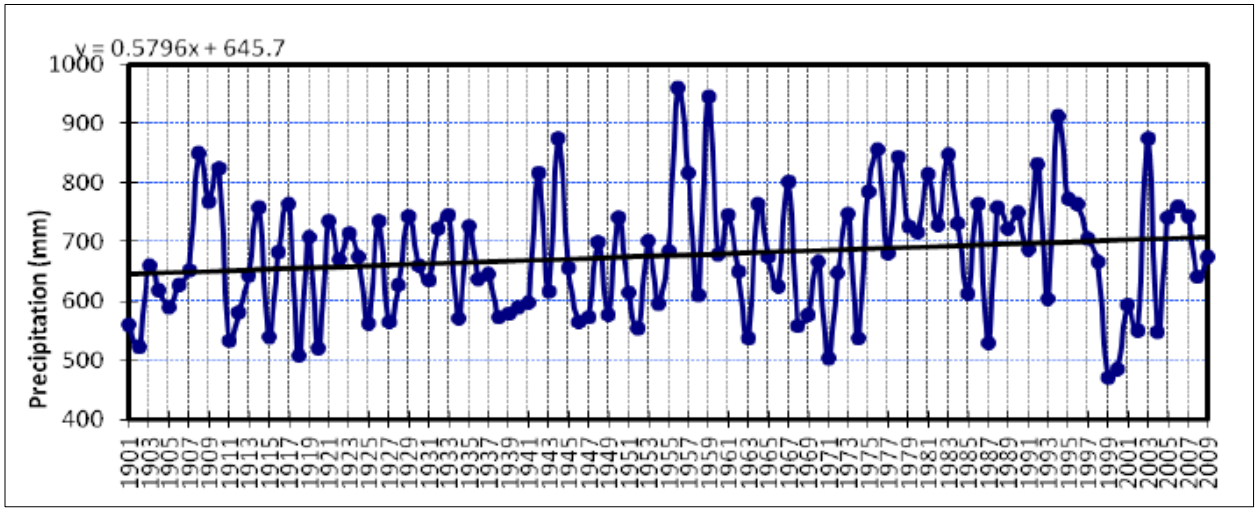
Pakistan's total annual precipitation ranges between 500 mm and 800 mm with higher amounts in the northern half, which receives handsome share from both winter and summer (Figure 4). Southern half of the country receives hardly 50% of the northern one because neither monsoon establishes well nor winter precipitation approaches with generous downpours. In winter, the mid-latitude westerly waves move across the lower latitudes and their troughs generally extend down to 35°N sometimes further south. Under the influence of the troughs of westerly waves as well occluded frontal systems, northern half of Pakistan receives substantial rainfall over low elevation plains and snowfall in mountainous regions during winter season. Summer brings monsoon to Pakistan, which contributes about 60% of the annual total precipitation from July to September. Pre-monsoon (May and June) is very hot and dry season and only localized convective rains occur occasionally. Similarly, autumn (October and November) is the dry season without

[39] The World Bank, 2018. PAKISTAN PK@100 - Shaping the Future ENVIROMENTAL SUSTAINABILITY. World Bank, Islamabad

[40] Rasul et al., 2012. Climate change in Pakistan: Focused on Sindh Province. Technical Report No. PMD-25. PMD, Islamabad

summer or winter rains but low temperatures do not produce as much stress as pre-monsoon does. The time series over the last 109 years shows slightly increasing trend (Fig) but not well-marked change when compared with the centurion scales. The change in total amount of rainfall on countrywide scale is hardly 60 mm increase over a period of 109 years, which makes an average rate of increase around 0.5mm/year. Figure 4 shows the precipitation trends in Pakistan (1901-2009). Predictions show rainfall variability alone could damage existing water infrastructure and push more than 12 million people into absolute poverty[41].

Figure 4: Precipitation Trends in Pakistan (1901-2009)[42]



Climate change compounds environmental and development challenges. Changing climate already manifests itself in rising temperatures and more prevalent heatwaves, melting in the cryosphere, and an increased risk of Glacial Lake Outburst Flooding (GLOF) in mountainous regions, as well as a rising sea level, accelerated costal erosion, and salination of surface and groundwater[43].

Consequences of climate change to Pakistan are more severe due to the dependence of its agro-based economy on glacial melt run off from the Himalaya-Karakoram-Hindukush mountain ranges. The cryosphere in the mountainous areas is retreating, increasing the risk of landslide and flooding in these regions; and sea level is rising, accelerating costal erosion, increasing the frequency and severity of storm surge and flooding, and causing salination of surface and groundwater. Extreme weather events have also grown in severity, with high human and economic costs. Climate change will intensify, with the mean annual temperature rising by 1–3°C around 2050 and 3–6°C around 2100,

41 Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk

42 Rasul et al., 2012. Climate change in Pakistan: Focused on Sindh Province. Technical Report No. PMD-25. PMD, Islamabad.

43 The World Bank, 2018. PAKISTAN PK@100 - Shaping the Future ENVIROMENTAL SUSTAINABILITY. World Bank, Islamabad

depending on global efforts to curb GHG emissions, and the sea level rising by a further 60 cm at the end of the century. Water availability is also expected to become more variable, given enhanced glacier melt, more erratic precipitation patterns, and more prevalent weather extremes, while demand for water is expected to grow, given the higher evaporation rates and demographic and economic growth.

Moreover, droughts, floods, and heatwaves are anticipated to gain in severity. Climate change impacts will be felt across all sectors and regions, and will slow down economic growth[44]. Even low levels of climate change could cost the economy up to 1 percent of GDP annually by mid-century. Climate change will also have profound implications on living standards, with Sindh and Punjab at the forefront (Mani et al., 2018)[45], and make it harder to eradicate poverty, potentially pushing up to 21.4 million additional people into poverty by 2050.

There is now one more month of heatwave days, sometimes with devastating consequences, such as the 2015 heatwave in Karachi, which took the lives of over 1,200 people[46]. Increase in the number of heatwave events towards the end of the century are also predicted to increasingly happen in the provinces of Balochistan and Sindh, however increase in heatwaves is most pronounced over the Punjab plains. In the period between 2076-2100, the increase in the number of heatwave becomes more than 75 over Punjab, implying an average increase of 3 events per year as compared to control period. Considering a high population density in the Punjab, this alarming increase in heatwave will pose a serious concern not only for far future but also for the near future. Moreover, densely populated cities like Lahore, Faisalabad, Rawalpindi, Multan, Gujranwala, Sargodha, and Sialkot are all located in this region, which are more susceptible to the negative impact of heatwaves as compared to the rural areas because of the phenomenon called “urban heat island effect”[47]

4.3 Social Sector

4.3.1 Population

According to 2017 population census reports, the total population of the Pakistan is 207,774,520 approximately 207 million[48]. The most heavily populated province is Punjab with a population of 110 million, followed by Sindh with 48 million Khyber Pakhtunkhwa with 30 million and Balochistan with a population of 12 million. The population Islamabad Capital Territory is 2 million, while that of FATA is 5 million. The population density is 250 persons per square km of the major part of the project area.[49] The urban centers are

44 The World Bank 2018. PAKISTAN PK@100 - Shaping the Future ENVIROMENTAL SUSTAINABILITY. World Bank, Islamabad

45 Mani, Muthukumara, Sushenjit Bandyopadhyay, Shun Chonabayashi, Anil Markandya, and Thomas Mosier. 2018. South Asia Hotspots: The impact of temperature and Precipitation Changes on Living Standards. Washington DC: World Bank.

46 The World Bank 2018. PAKISTAN PK@100 - Shaping the Future ENVIROMENTAL SUSTAINABILITY. World Bank, Islamabad

47 SDPI. 2015. Future Heatwaves in Pakistan under IPCC’s AR5 climate change scenario. https://sdpi.org/publications/files/PB-46.pdf

48 Pakistan Bureau of Statistics, provincial census result 2017

49 Pakistan Population Census Organization

densely populated with an average of 1000 person per square kilometer. Districts located close to the city centers are thickly populated, whereas, the districts lying in the southern and northern boundaries are relatively thinly populated. The province wise distribution of population of Pakistan is given in Table 8 and 9.

Table 8: Population Census-2017

Administrative unit	Households (million)	Population 2017 [million]				1998-2017 Average Annual Growth Rate
		Male	Female	Transgender	Total	
Pakistan	32.20	106.45	101.32	10,418	207.77	2.40
Rural	20.01	67. 30	64. 89	2,767	132.19	2.23
Urban	12.19	39.15	36.43	7,651	75.58	2.70

Source: Pakistan Bureau of Statistics

Table 9: Province Wise Population and Growth Rate

Areas	Population 1998 (million)	Population 2017 (million)	Average annual Growth Rate % (1981-98)	Average annual Growth Rate % (1998- 2017)
Pakistan	132.35	207.77	2.6	2.40
Khyber Pakhtunkhwa	17.74	30.52	2.8	2.89
Punjab	73.62	110.01	2.6	2.13
Sindh	30.44	47.88	2.7	2.41
Balochistan	6.57	12.34	2.4	3.37
FATA	3.18	5.00	2.1	2.41
Islamabad	0.81	2.00	5.2	4.91

Source: Population Census-2017, Pakistan Bureau of Statistics

4.3.2 Urbanization

Urbanization growth in Pakistan is currently at 2.7 percent[50]. The urban population shows a growing trend with 36.38 percent of the population living in urban areas. Sindh province is the most urbanized among all the provinces in Pakistan as per the results with 52.02 percent of its population based in urban areas. Punjab has the highest share of population of 52.9 percent in population pie but its share has declined as compared to 1998. The share of urban population in Punjab has slightly increased from 31.27 percent in 1998 to 36.71 percent in 2017. Table 10 shows the urbane share of population in Pakistan.

Table 10: Urban share of Population

Area	Population (Million)			Urban Share (%)		
	1981	1998	2017	1981	1998	2017
Pakistan	84.25	132.35	207.77	28.3	32.52	36.38
Khyber Pakhtunkhwa	11.06	17.74	30.52	15.06	16.87	18.77

[50] Pakistan. Population Census. 2017. Pakistan Bureau of Statistics, Islamabad.

FATA	2.20	3.18	5.00	-	2.69	2.84
Punjab	47.29	73.62	110.01	27.6	31.27	36.71
Sindh	19.03	30.44	47.89	43.32	48.75	52.02
Balochistan	4.33	6.57	12.34	15.62	23.89	27.55
Islamabad	0.34	0.81	2.00	60.06	65.72	50.58

Source: Population Census-2017, Pakistan Bureau of Statistics

According to Population and Housing Census 2017, the population of ten major cities has increased by 74.8 percent as compared to 1998 census. The total population of the 10 major cities in Pakistan has increased from 23.41 million in 1998 to 40.92 million in 2017. Approximately 35 percent of Sindh's total population lives in Karachi and Hyderabad alone. Karachi occupies the top position in the list of most populous cities of Pakistan with population of 14.91 million, which shows an increase of 59.8 percent in 19 years. Likewise, the population of Hyderabad city increased from 1.16 million to 1.73 million showing 49.1 per cent growth. The population of Lahore city has increased by 116.3 percent from 5.14 million to 11.12 million in 2017, while Faisalabad's population has increased from 2.0 million to 3.2 million in 2017 showing a growth of 60.0 percent. Similarly, the population of Rawalpindi has increased by 49.3 percent from 1.40 million to 2.09 million and Gujranwala by 78.8 percent from 1.13 million to 2.02 million in 2017. The population of Peshawar city has increased by 101 percent from 0.98 million to 1.97 million in the same period. The population of Quetta city has increased by 78.6 percent to 1.0 million in 2017 from 0.56 million in 1998. Table 11 shows the population of major cities in Pakistan.

Table 11: Population of Major Cities in Pakistan

Major Cities	Census 1998 (million)	Census 2017 (million)
Karachi City	9.33	14.91
Lahore City	5.14	11.12
Faisalabad M.CORP	2.00	3.20
Rawalpindi City	1.40	2.09
Gujranwala M.CORP	1.13	2.02
Gujranwala M.CORP	1.13	2.02
Peshawar City	0.98	1.97
Multan City M.CORP	1.19	1.87
Hyderabad City	1.16	1.73
Islamabad M.CORP	0.52	1.01
Total	23.41	40.92

Source: Population Census-2017, Pakistan Bureau of Statistics

The phenomenal increase in urbanization in Pakistan may be attributed to two major causes, which include natural growth in population and internal migration/relocation (Arif and Hamid, 2009)[51].

[51] Arif, M. G. & Hamid, S. (2009). Urbanization, city growth and quality of life in Pakistan. European Jouranl of Social Science, 10(2), 196-215.

The other important factors are rural-to-urban migration, war and conflicts. At the time of Indo-Pak partition in 1947, millions of Indian Muslims entered Pakistan, and many established roots in urban areas of Sindh and Punjab provinces. Similar influxes occurred during wars with India in 1965 and 1971. In the 1980s, as the anti-Soviet insurgency raged in Afghanistan, masses of Afghans flowed into Western Pakistan, with many ending up in the cities of Quetta and Peshawar. More recently, military operations in Pakistan's tribal areas and Afghanistan have triggered an exodus of people to Pakistani cities particularly Peshawar, Quetta, and Karachi. Other causes of rural-to-urban migration are rural water shortage affecting fishermen and farmers; natural disasters including flooding and earthquakes and search for access to better-quality healthcare, employment and education opportunities (Jabeen et al. 2015)[52].

Environmental challenges of rapid urbanization include air, water, land and noise pollution, deforestation and habitat degradation resulting in serious health issues, poverty, water stresses and climatic changes (Qasim et al. 2014)[53].

Pakistan has been urbanizing rapidly and it is estimated that about 50 percent of the population will be living in urban areas by 2030. This has translated into Pakistan being ranked as one of the countries with the highest levels of exposure to air pollution in the South Asia region, measured as mean annual exposure to fine particulate matter (PM 2.5). The problem is amplified in the cities—the engines of Pakistan's growth—with urban agglomerations such as Lahore reaching levels of PM 2.5 in the range of 2 to 14 times higher than the World Health Organization (WHO) guidelines[54].

4.3.3 PhD Research in Pakistan

The Higher Education Commission has through various initiatives focused on increasing the quantity of PhDs in Pakistan over the last 5-10 years. This has resulted in increasing the number of published PhDs from around 800 in 2010 to over 1300 in 2014[55]. As per data provided by the Higher Education Commission, 124 universities out of total 190 had 28,393 PhD students enrolled during the year 2017-2018. Despite the high enrolment, a survey conducted by the Knowledge Platform and British Council on the 'University Research System in Pakistan' reveals that the university system in Pakistan produces a very low level of PhDs per university. For example, in 2014, public sector universities graduated on average 12 PhDs, while private universities graduated 1.4 PhDs, giving a combined average of 7.6 PhDs per university each year.[56]

---

[52] Nasira Jabeen, Umm-e-Farwa and Zafar Iqbal Jadoon. 2015. Urbanization in Pakistan: A Governance Perspective. Proceedings of Sydney International Business Research Conference 2015, University of Western Sydney Campbelltown, Australia, 17-19 April, 2015.

[53] Qasim, M., Anees, M.M, Ghani, M.U, Malik, J., Khalid, M and Bashir A, (2014). Environment Degradation Cause By Urbanization in Pakistan (A review Paper). Bulletin of Energy Economics, 2(3),62-71.

54 The World Bank 2018. PAKISTAN PK@100 - Shaping the Future ENVIROMENTAL SUSTAINABILITY. World Bank, Islamabad

[55] http://www.hec.gov.pk/english/universities/Pages/PhD-Produced-by-Pakistani-Universities.aspx

[56] The University Research System in Pakistan; Knowledge Platform and British Council, 2018

Data on PhD theses in Pakistan is publicly available through the HEC established Pakistan Research Repository[57]. The purpose of this repository is to promote the international visibility of research originating out of institutes of higher education in Pakistan by maintaining a digital archive of all PhD and MPhil these and providing a free, single-entry access point to view the manuscripts of research dating as far back at 1933. An analysis of four years of PhD theses uploaded to the PRR from 2014 – 2017 shows that a total of 2468 theses were published and uploaded to the PRR during this period. Of these, 26% can be classified in subjects relevant to the priority sectors identified for the project. Information provided in the Pakistan Research Repository allows for the subject classifications provided in Table 12; Agriculture, Engineering, Economics and Computer Science. Further classifications for strategic sectors such as water, energy, food security, artificial intelligence, cyber security are not available. The PRR shows that Agriculture is a popular research sector, with 10% of all PhD theses from 2014-2017 published on agriculture related topics. Moreover, of the 628 PhD these in the project strategic sectors, 40% were in agriculture, followed by 28% in Engineering.

Table 12: Number of PhD Theses in Strategic Sectors

Topic	Total Number of PhD Theses (2014-2017)
Agriculture and Related Technologies	252
Engineering and Allied Operations	184
Economics	123
Computer Science & Knowledge Systems	89
Total PhDs in Strategic Sectors	**648**

An analysis based on PhD titles and abstracts provided on PRR for theses published in 2017 shows that just 34% of the research conducted in the strategic sectors had potential applications for the public and private sector. The highest potential applicability of 50% was observed in PhD theses in agriculture and computer science, with 26% in engineering and 14% in economics. According to the PhD Doctors Association of Pakistan, there were 720 unemployed PhD holders in September 2018. The Higher Education Commission, in response confirmed that majority of the unemployed PhD holders had degrees in Chemistry, Agriculture, Biology and Physics.[58]

A survey of 14 universities conducted by The Knowledge Platform, shows the ratio between teaching time and research time of faculty, where even professors are spending more than half their time teaching (**Figure 5**)[59]. This also results in faculty working on and supervising research in various fields simultaneously, thus spreading their focus and resulting in lower quality of research. HEC statistics show that the student faculty ratio

[57] prr.hec.gov.pk

[58] http://hec.gov.pk/english/news/news/Pages/HEC-PhD-DB.aspx

[59] The University Research System in Pakistan, 2018, The Knowledge Platform and British Council

in public universities is 35:1, while that in private universities is 19:1 (**Figure 6**). However, private universities only cater to 19% of the university student population.[60]

Figure 5: Ratio of Teaching and Research Time (Survey)

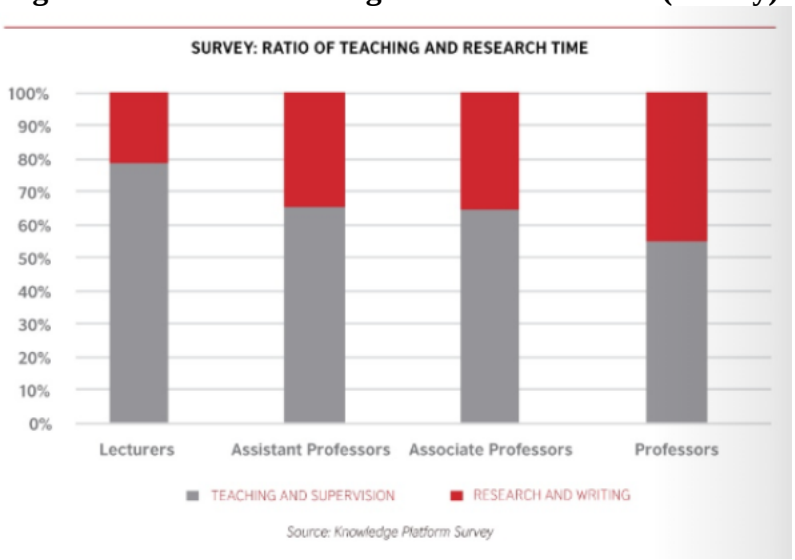
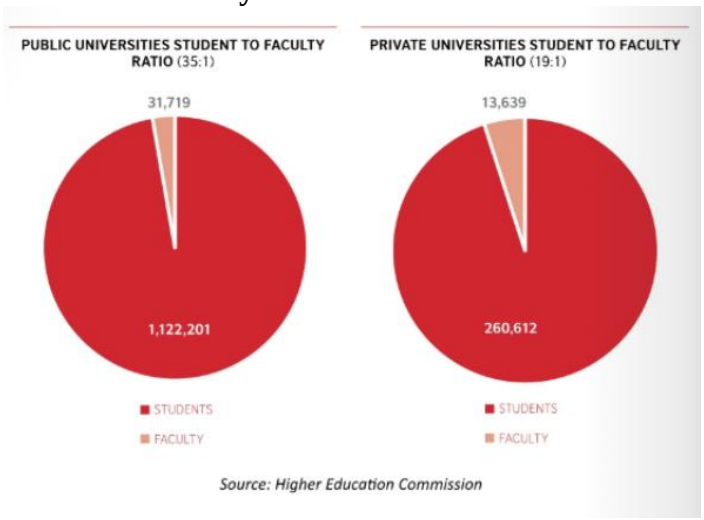


Figure 6: Student-Faculty Ratio in Public and Private Universities



4.3.4 Research Spending in Pakistan

Spending on research and development in Pakistan has been exceptionally low, with only 0.25% of the GDP being invested into R&D in 2015.[61] It is important to note that a large part of this funding goes directly to government institutes, commissions and departments with research mandates, who do not necessarily have any collaboration with universities. The main avenues open to universities for accessing this allocation include grants

[60] The University Research System in Pakistan, 2018, The Knowledge Platform and British Council

[61] The World Bank - https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?end=2015&locations=PK&start=1997

provided by the HEC and the Pakistan Science Foundation (PSF). Some funding, though limited, is also available through federal and provincial government departments. The government also imposes a cess on certain industries and economic activities, part of which is available for research and development in the related industries, which may be through universities. The level of engagement with universities has however, been historically low, with the onus of liaising with industries lying with universities, rather than the industries themselves. [62] An exception to this is the Ignite National Technology Fund, which funds startups and innovative projects that utilize 4th industrial wave tech to solve local problems and target global opportunities in health, education, energy, agriculture, telecom, finance and other verticals. The financial support for Ignite is provided by the federal government, which in turn collects the prescribed contributions from PTA licensees operating in the telecommunications domain.[63]

Spending by HEC on research programmes in 2015-2016 is provided as **Figure 7**.[64]

Figure 7: Spending by HEC on Research Programmes (2015-2016)

HEC Research Programmes (2015 – 2016)		
Research Programmes (with Funding Data (PKR))		
National Research Programme for Universities	1,123,710,000	HEC's major research funding programme
Faculty Start-Up Research Grant	180,000,000	Grants to new PhDs to set up research initiatives
Grant to Organise Seminars, Conferences	115,129,572	Grants for seminars and conferences
Textbook and Monograph Writing Scheme	35,312,000	Support for development of textbooks and monographs
Scientific Instrumentation	15,826,273	Payments to service providers for shared scientific instruments
Social Integration Outreach Programme	9,500,000	Grants to develop relationship between universities and communities
Pak-France PERIDOT Research Programme	8,445,000	Science and technology cooperation between Pakistan and France
Knowledge Economy Partnership	7,760,000	Collaboration between HEC, DFID and the British Council
Patent Filings	6,500,000	Payments for overseas patent applications
Pakistan Programme for Collaborative Research	4,606,000	Funding for overseas research collaboration by Pakistani faculty
Outstanding Research Awards	4,520,000	Awards for outstanding research, innovation and publication
Total	**1,511,308,845**	

HEC's principle research funding programme is the National Research Program for Universities (NRPU), initiated to award research grants to promote and facilitate innovation and R&D in universities. The NRPU is open to public and private sector university faculty for grants up to Rs.20 million per project. The size of the grant is dependent upon the Impact Factor rating of the faculty member's publications. The funding outlay for the NRPU has significantly increased from close to Rs.300 million in 2010 to over Rs.1 billion in 2016 (**Figure 8**). [65] The highly competitive grants programme had an acceptance rate of 27% in 2017-18.

[62] The University Research System in Pakistan, 2018, The Knowledge Platform and British Council

[63] https://ignite.org.pk/

[64] HEC Annual Report 2015-2016

[65] The University Research System in Pakistan, 2018, The Knowledge Platform and British Council

4.3.5 Status of Thematic Research

Of the 1104 approved projects under the NRPU in 2017-18, 40% were in subjects relevant to the strategic sectors identified by the HEC, i.e., engineering, agriculture, social sciences, CS & IT (**Table 13**).

Figure 8: Spending by HEC on Research Programmes (2015-2016)

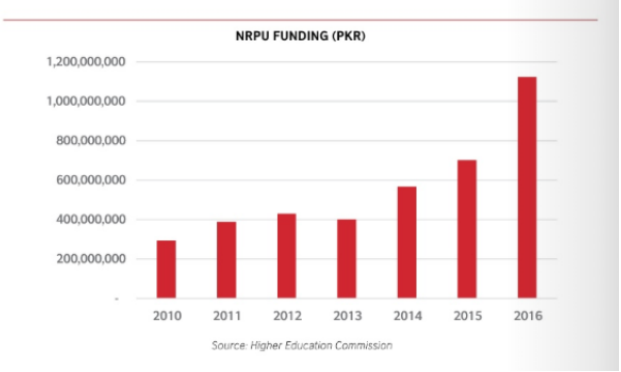


Table 13: NRPU Approved Projects 2017-18[66]

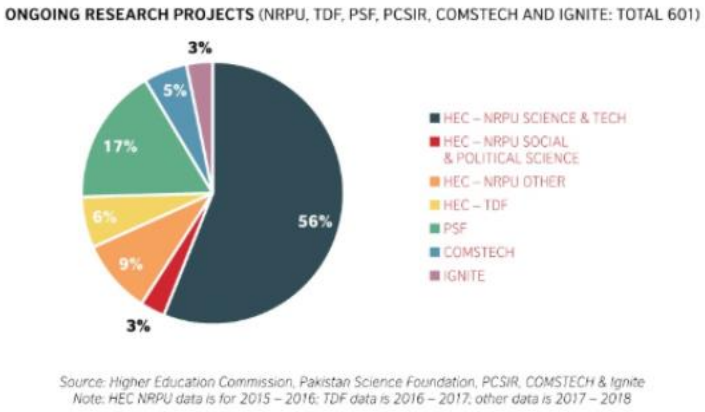
Subject	Approved Projects	%
Physical Sciences	248	22%
Engineering Sciences	161	15%
Biotechnology	146	13%
Agriculture	139	13%
Social Sciences	96	9%
Biological Sciences	90	8%
Medical & Pharmaceutical Sciences	90	8%
Veterinary Sciences	51	5%
Natural & Environmental Sciences	46	4%
CS & IT	37	3%
Total	**1104**	**100%**

Major research funding in Pakistan is through HEC funds such as the NRPU and the Technology Development Fund, the Pakistan Science Foundation, COMSTECH and Ignite. The HEC has been increasing research funding in these programmes which primarily fund research in science and technology. **Figure 9** shows the contribution of each programme to the ongoing research projects in Pakistan[67]. The majority research projects are funded by the NRPU in science and technology, with a mere 3% projects being in social and political sciences.

[66] http://hec.gov.pk/english/services/universities/nrpu/Pages/NRPU%20Approved%20Projects.aspx

[67] The University Research System in Pakistan, 2018, The Knowledge Platform and British Council

Figure 9: Ongoing Research Projects in Pakistan



Source: Higher Education Commission, Pakistan Science Foundation, PCSIR, COMSTECH & Ignite
Note: HEC NRPU data is for 2015 – 2016; TDF data is 2016 – 2017, other data is 2017 – 2018

The US-Pakistan Centers for Advanced Studies were launched by USAID in 2014 to strengthen the culture and system of applied thematic research in Pakistan. Under this programme, four thematic centers were set up across the country, with connections to US Universities.

1. The USPCAS in Agriculture and Food Security at the University of Agriculture (UAF), in Faisalabad, in partnership with University of California Davis
2. The USPCAS in Water at Mehran University of Engineering and Technology (MUET), Jamshoro, in partnership with University of Utah
3. The UPSAC in Energy at National University of Science and Technology (NUST), Islamabad, in partnership with Arizona State University
4. The UPSAC in Energy at the University of Engineering and Technology (UET), Peshawar, in partnership with Arizona State University

The centers are focused on creating a critical mass of highly skilled manpower for their respective industry sectors and undertaking quality applied research relevant to Pakistan's needs. This has been achieved by offering up to date MSc, MPhil and PhD programmes with curriculum developed in partnership with US universities, exchange programmes for students and faculty, and applied research grants.

Since 2014, a total of 80 applied research projects have been funded by three of the established centers in Agriculture & Food Security at UAF, Energy at NUST, and Water at MUET. Approximately 17% of the research projects are in collaboration with US universities, providing access to international experts and latest technology.
In 2017-2018, the HEC, with support of the Planning Commission, took another step towards collaborative thematic research by launching four National Centers in emerging areas of science and technology.

1. National Center for Artificial Intelligence at the National University of Science and Technology (NUST), Islamabad
2. National Center for Robotics and Automation at the National University of Science and Technology (NUST), Islamabad
3. National Center for Cyber Security at Air University, Islamabad

4. National Center for Data Analytics and Cloud Computing at the Lahore University of Management Sciences (LUMS)

The objective of these centers is to promote collaboration between universities and create a hub for innovation, scientific research and knowledge transfer. The centers aim to facilitate researchers in their respective fields and grow an industry following international trends. The HEC and Planning Commission have established the four centers through a competitive process to identify leading researchers in the field and establish state of the art laboratories under their supervision. While the centers are housed in the universities mentioned above, they will also have affiliated labs at universities across the country.

As shown in **Figure 9**, only about 3% of approved projects under major government backed research funding programmes (NRPU, TDF, Ignite, PSF, PCSIR and COMSTECH) are related to social and political science subjects (**Figure 9**). The majority of evidence based economic research is being conducted in private centers and higher education institutes in Lahore such as the Center for Economic Research in Pakistan (CERP), International Growth Center (IGC), Lahore University of Management Sciences (LUMS) and the Center for Research in Economics and Business (CREB) at the Lahore School of Economics (LSE). Public sector institutions leading in economic research include the FC College, Pakistan Economic Research Institute (PERI) and the Pakistan Institute of Development Economics (PIDE).

IGC, CREB and CERP have been established to contribute towards evidence based policy making in Pakistan. The Centre for Research in Economics and Business (CREB) was established in 2007 to conduct policy oriented research with a rigorous academic perspective on key development issues facing Pakistan. CREB focuses on research on economic policies and institutions and training researchers to international standards. The Center for Economic Research in Pakistan (CERP) is working to bridge the gap between academic research and policy making in Pakistan by using established and frontier scientific research techniques to collect and analyze data to help decision makers create and implement sound economic and social policies. CERP collaborates with governments, policymakers, civil society, and NGOs to promote the use of rigorous research methodology, accountability, and evidence-based decision-making. The IGC Programme in Pakistan was initiated with the aim of improving the capacity to generate world-class policy-oriented research on reform issues critical to sustained economic growth. IGC provides independent and demand-led research to support growth policy in Pakistan and has supported federal and provincial governments on several policy issues. The center has also formed partnerships with the private sector.

4.3.6 Commercialization of Research

To enhance the quality and commercialization of research, the Higher Education Commission has a number of initiatives including the National Research Programme for Universities (NRPU), establishment of Offices of Research Innovation and Commercialization (ORICs) in universities, and grants for commercialization of research such as the Technology Development Fund (TDF).

In 2016, the Higher Education Commission launched the Technology Development Fund (TDF) in collaboration with the Planning Commission with a mission to step up thematic research and facilitate higher education institutions to serve as engines for socioeconomic development in Pakistan. The TDF funds proposals of completed interdisciplinary applied research projects for prototype development and industrial value addition for technology development in the following sectors:[68]

1. Telecommunication, Information and Technology/Computers (applications in Govt. services, health, textile, agriculture & dairy etc.)
2. Engineering Sciences, Micro Electronics, Water, Power, Energy and Fleet Management
3. Biotechnology and Allied fields (in Health, Agriculture, Textile, Leather & Dairy etc.)
4. Material Sciences/Man Made Material (Nanotechnology)
5. Robotics, Defence and Military needs
6. Any other applied discipline which is inductive or conducive to success of products developed or upscale the process of Industrial level manufacturing.

The objective of the TDF is to provide opportunities to researchers to translate their applied research into workable solutions and technologies for adoption by industry. These projects should aim to develop a product or service which would positively impact the economy, solve a current problem, meet a market need, utilize local raw materials, move current products up the value chain, or create large scale employment. The proposals for the TDF must be in collaboration with prospective industries, who can take up the product for its commercialization and marketing.

The number of proposals being submitted for the Technology Development Fund has risen rapidly since its start, from 116 for the 1st call in 2015-16 to 339 for the 3rd call in 2018-19. A total of 89 projects were accepted under the 2nd call of TDF, 45% of which were awarded to the following four universities; The University of Agriculture Faisalabad, University of Veterinary and Animal Sciences Lahore, University of Engineering and Technology Lahore, and the National University of Science and Technology in Islamabad. 94% of the projects were in collaboration with a private sector industry, while 2 projects were in collaboration with the Pakistan Armed Forces.[69] Though majority of the accepted projects have been from Punjab and Islamabad, there has been an increase in representation from other provinces since the 1st call, as shown in **Figure 10**. There has also been a significant increase in industry sectors collaborating with universities for the TDF, and in investment offered by the private sector (**Figure 11**).

Figure 10: TDF Projects per Province

[68] http://www.hec.gov.pk/english/services/students/TDF/Pages/Intro.aspx

[69] http://www.hec.gov.pk/english/services/students/TDF/Pages/Achievements.aspx

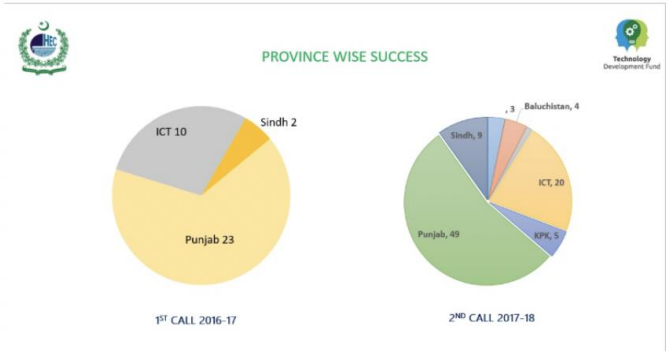
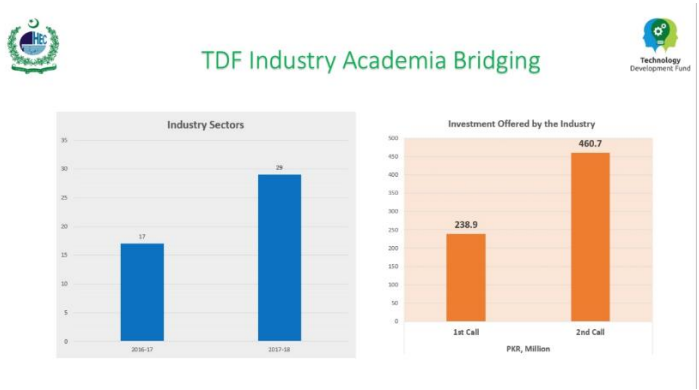


Figure 11: Industry Representation in TDF



The US-Pakistan Centers for Advanced Studies have a specific focus on thematic applied research relevant to the current problems in their respective sectors. Since 2014, a total of 80 applied research projects have been funded by three of the established centers in Agriculture & Food Security at UAF, Energy at NUST, and Water at MUET. The centers have also been working towards funding applied research with industry and sector applications, by conducting research in partnership with the public and private sector. 25% of the applied research projects funded by the UPSCAS in Water at MUET have private sector companies or public sector organizations as research partners.

Recognizing the gap in applied research in Pakistan, the Centers of Advanced studies have through their grants evaluation and monitoring procedures included criteria for applicability and commercialization of research. This includes linking release of funds to achievement of milestones, and regular monitoring and evaluation. The Grant Management Unit at the USPCAS for Agriculture and Food Security at University of Agriculture Faisalabad is responsible for managing on-going activities of projects. On receipt of comprehensive annual or biannual progress report (based on milestone covered/delayed, budget utilized/underutilized), F&G and M&E team of experts from the center visit the project site and physically verify the work done/delays in the achievement of time bound targets. If the performance is satisfactory, the team will recommend the next release of funds for the project. In case of unsatisfactory performance, the PI along with his/her team will be asked for justification of the poor performance. After completion of the project, the PI submits a final technical/financial report duly signed by the head of

the institute for evaluation of the research findings. She/he also submits a finding/ invention/ discovery report based on the research outcomes ready to be commercialized The centers have also tailored research grants to relate to ongoing and anticipated challenges within their respective sectors and address gaps and issues to increase the societal and economic benefit of applied research projects. For example, the USPAC in Agriculture and Food Security at UAF has an established Council for Research and Policy, with stakeholders from the public sector, agribusiness, private sector and farmer community, to identify gaps and commission research that is relevant and market driven. Similarly, the UPCAS in Energy at NUST has established a Think Tank on Energy and Energy Policy that holds relevant dialogues between he center and Pakistan's public and private energy stakeholders to mutually identify pressing energy issues of the country. With only around 15% of the applied research projects having been recently completed, there are no assessments or data to evaluate the success of these measures in achieving the desired results of applicability and commercialization.

The Higher Education Commission, in its Vision 2025 recognizes the importance of commercialization by setting forth research related objectives to:

- Strengthen Offices of Research Innovation and Commercialization (ORICs) established in research universities
- Increase collaborative research with growing industries in the country
- Enhance and expand business incubation centers in universities
- Increase applied research programmes and establish new science and technology universities with a focus on applied research
- Enhance use of investments made in information and communication technologies
- Increase research funding that will lead to international patents

The Office of Research Innovation and Commercialization (ORIC) is envisioned to serve as a pivotal point, encompassing all research activities in the university, from development of research proposals to the commercialization of research products. The HEC is working with universities by providing guidance on the establishment of fully functional ORICs with an objective to develop, expand, enhance and manage the university's research programs and to link research activities directly to the educational, social and economic priorities of the university and its broader community. The ORIC is also responsible for assuring that the quality of research reflects the highest international standards and advances the stature of the university internationally.

As per HEC requirements, the ORIC shall guarantee that all research programs and policies reflect the core values of academic freedom, professional integrity and ethical conduct and are in full compliance with all policies, legal requirements and operational standards of the university. The ORIC must work towards improving the environment for all research and scholarship by:

- Supporting the strategic research directions and policies of universities
- Improving integration of research and education at all levels of the institution
- Increasing and diversifying external research funding

- Improve recruitment and retention of the top faculty
- Translating research for the public's benefit
- Improving and strengthening university-industry relationships
- Promoting entrepreneurship, technology-transfer and commercialisation activities which improve and support the economy
- Promoting and improve multi-disciplinary research initiatives

As per the Higher Education Commission, there are a total of 66 established and notified ORICs in universities in Pakistan. Most of these, 36%, are in universities located in Punjab, while 26% are in Sindh, followed by 18% in KPK and 17% in Islamabad (**Table 14**). Notified ORICs in public universities get a 15% overhead from HEC research grants awarded to the university, as well a recurring budget for new initiatives. ORICs in private universities are not provided any incentives by the HEC. Recognizing the gap in capacity of higher educational institutes, the HEC arranges practical learning for ORIC management mainly on developing and implementing IP policies, licensing and negotiation with the industry, ways of transferring research benefits to society, legal modalities in the commercialization process, and identifying opportunities to generate revenue. For example, the ORIC at NUST, having had great success with innovation and commercialization, is active at helping set up and train ORICs at other universities at the request of HEC. The HEC gathers annual reports from notified ORICs to check progress and efficiency.

Table 14: Number of Established and Notified ORICs in Pakistan

Federal	Punjab	Sindh	Balochistan	KPK	Other	Total
11	24	17	1	12	1	66
17%	36%	26%	2%	18%	2%	100%

The HEC has also collaborated with the Intellectual Property Organisation (IPO) Pakistan and Ministry of Science & Technology (MoST) to support the establishment of Technology and Innovation Support Centres (TISC) under the World Intellectual Property Organisation (WIPO) TISC programme at ORICs in higher education institutes and Government Organisations. The purpose of these centers is to provide universities with information and access to online patent database systems, science and technology resources, intellectual property publications, and resources on technology commercialization and marketing. Currently, 23 TISCs have been established in public and private universities in Pakistan.

4.3.7 Gender and Outreach – Postgraduate Studies and Research

Statistics collected by the Higher Education Commission from 175 public and private universities shows that there was a total of 211,646 students enrolled in postgraduate programmes (Masters, MS, MPhil and PhD) in 2017-18, 13% of which were PhD students. 40% of the total students enrolled in Master, MS, MPhil and PhD were female as reported by universities. The highest number of female students was reported in

Punjab (44,600), followed by Federal/Islamabad (18,900) and Sindh (13,750), as shown in **Figure 12**.

The proportion of female students in total postgraduate student body is shown in **Figure 13** for each province. The highest proportion of 47% in Punjab and 41% in Federal/Islamabad. The lowest proportion of 25% was observed in KPK. The highest proportion of female students was observed in medical universities with over 60% of the enrolled students being female. A higher ratio of female to male students was also found in general and social science universities. For example, Forman Christian College in Lahore has 61% female students, Lahore University of Management Sciences (LUMS) has 66%, Lahore School of Economics (LSE) has 55% and Quaid-e-Azam University has 53% female students in postgraduate programmes.

The proportion of female students in engineering, science and technology universities is observed to be low, ranging from 10% to 25%. The US-Pakistan Centers of Advanced Studies have detailed gender policies to increase the number of female students and faculty. The USPCAS at the University of Agriculture Faisalabad has been successful in meeting its target of 50% female students by keeping quotas while awarding scholarships and fellowships. The USPCAS for Energy at NUST does not have any quotas for female students, but encourages enrolment through extra stipends for female scholarship holders as well as targeting marketing in women's universities. Despite these efforts, they have only been able to achieve an 18% enrollment rate. UPSCAS for Water at MUET has 34% female students enrolled across the center, however the proportion of female PhD students is much lower at 15%.

Figure 12: Female Students in each Province

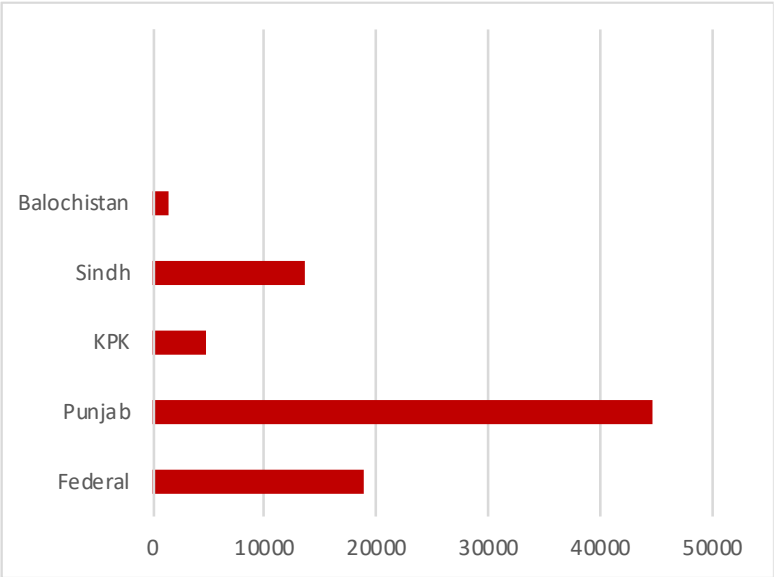
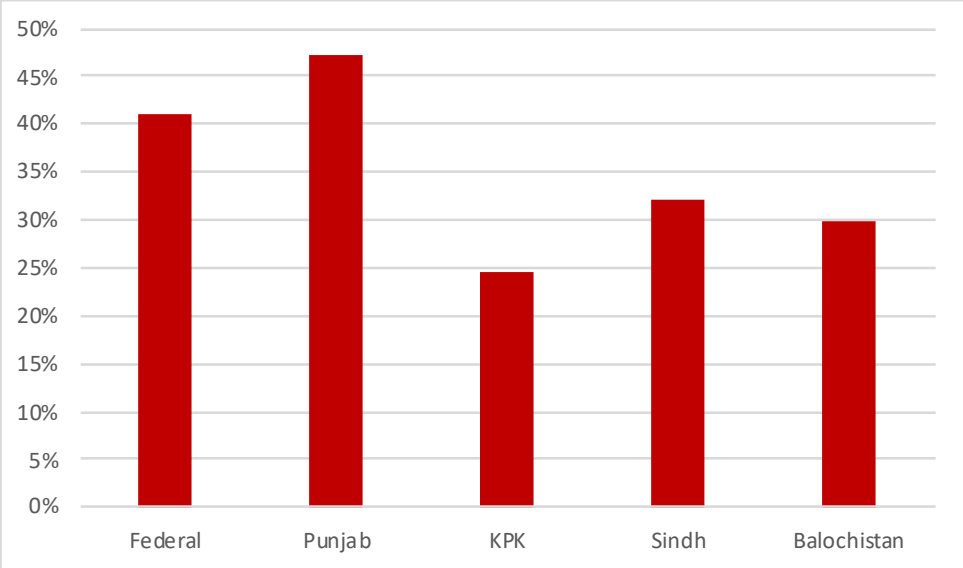


Figure 13: Proportion of Female Students in Total Student Body



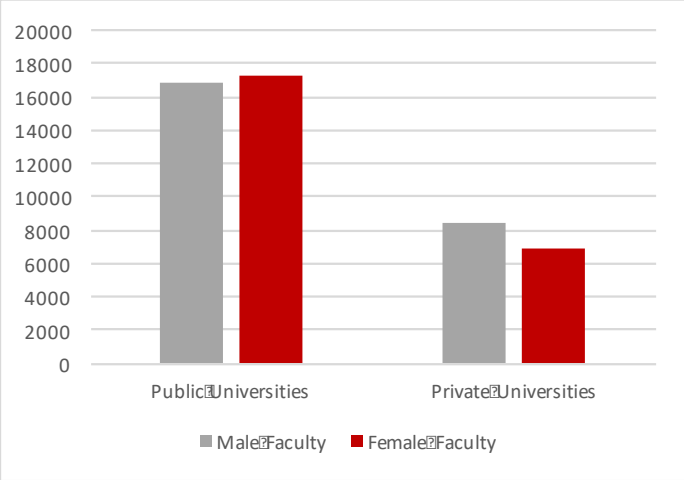
HEC statistics provided in **Table 15** show that out of the 124 universities with PhD enrolment in 2017-2018, 31% were in Punjab, followed by 27% in Sindh and 22% in KPK. However, only 8% of total PhD students were enrolled in universities in KPK and 15% in Sindh. The highest number of PhD students were reported in Punjab (55%), followed by 21% in universities located in Islamabad.

Table 15: Student Enrollment in PhD Programmes 2017-2018

	Federal/ Islamabad	Punjab	KPK	Sindh	Balochistan	Other	Total
Number of Universities	17	38	27	33	3	6	124
Total Enrollment	5,928	15,493	2,144	4,151	222	455	28,393

Statistics collected from 182 universities by the Higher Education Commission show that there were over 49,000 faculty members in public and private universities in 2017-2018, 70% of whom were teaching in public sector universities (**Figure 14**). The number of male and female faculty members as reported by the universities was almost equal, with 50% of faculty in public universities and 45% of faculty in private universities being female. A higher proportion of female faculty members was observed in social science and general universities. Geographically, majority of universities located in Islamabad have a very high proportion of female faculty members (over 70%), while all universities with less than 10% female faculty members were found to be located in KPK and Balochistan.

Figure 14: Male and Female Faculty Members in Universities



Data provided by the HEC shows that the majority of the NRPU grants were awarded to researchers based in universities in Punjab (43%), followed by universities in Islamabad 29%, 14% in KPK, 10% in Sindh and only 2% to universities in Balochistan. The number of female researchers is much lower than the number of male researchers in the National Research Programme for Universities (NRPU) and Technology Development Fund (TDF). Only 16% of the principal investigators in the accepted TDF projects in 2017-18 were female, while only 14% of the principal investigators for projects accepted under the NRPU from 2010-2014 were female.

4.3.8 Gender and Outreach – Affiliated Colleges

As per data provided by HEC, there are 3032 affiliated colleges (ACs) located across Pakistan, 47% of which are public institutions. These ACs offer graduate and postgraduate courses under the academic guidance of the affiliating university, and are under the administration of Higher Education Departments of provinces. **Table 16** shows that 95% of all Affiliated Colleges are located in urban areas. Out of the 146 colleges located in rural areas, 70% are public colleges.

Table 16: Affiliated Colleges by Location

Type	All Affiliated Colleges	Public Affiliated Colleges	Private Affiliated Colleges
Rural	5%	7%	3%
Urban	95%	93%	97%

46% of students are enrolled in Affiliated Colleges in Punjab, followed by 25% in Khyber Pakhtunkhwa and 22% in Sindh. Balochistan has a mere 3% of the students enrolled in Affiliated Colleges (**Figure 15).**

Figure 15: Province Wise Enrollment in Affiliated Colleges

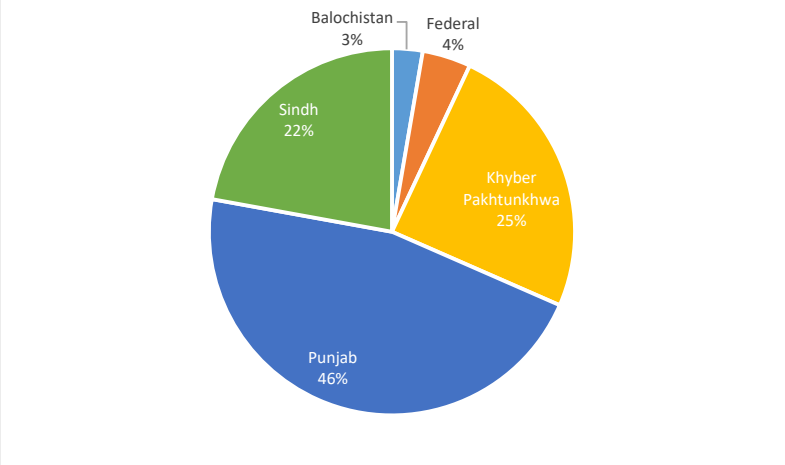


Table 17 shows that overall, 55% of public and private colleges are co-educational, 26% are female colleges and 18% are all male colleges. The number of co-educational institutions is significantly higher in private colleges (84%). In public affiliated colleges, 45% are all female colleges.

Table 17: Affiliated Colleges by Type (Male, Female, Co-Educational)

Type	All Affiliated Colleges	Public Affiliated Colleges	Private Affiliated Colleges
Male	18%	32%	6%
Female	26%	45%	9%
Co-Ed	55%	22%	84%

Enrollment figures for 2016-17 show that 55% of students enrolled in ACs were female. The highest number of female students are enrolled in colleges in Punjab (276,000), followed by Sindh (100,000) and Khyber Pakhtunkhwa (96,000). Only 11,000 female students are enrolled in colleges in Balochistan (**Figure 16).** The highest number of male students is also enrolled in colleges in Punjab (156,000), followed closely by Khyber Pakhtunkhwa (132,000) and Sindh (106,000) (**Figure 17**).

Figure 16: Province Wise Female Students Enrollment in Affiliated Colleges

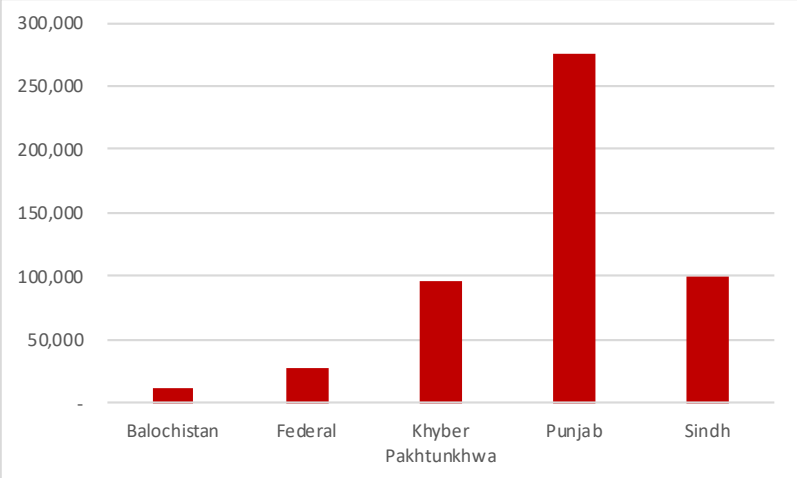
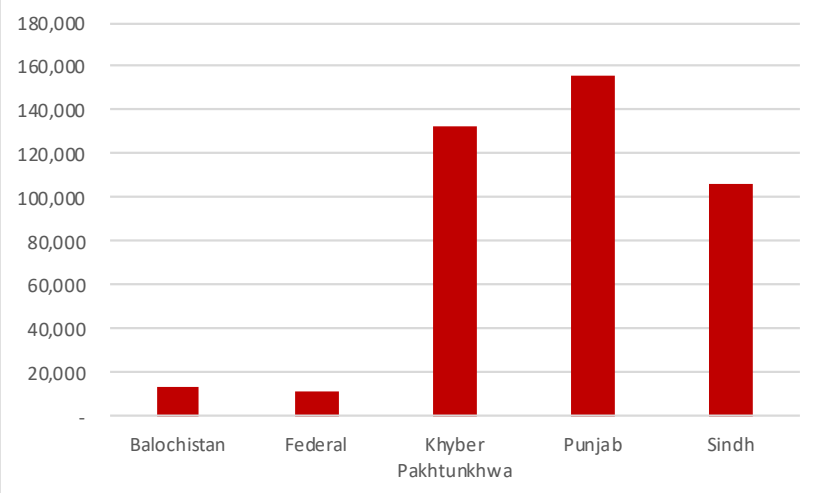


Figure 17: Province Wise Male Students Enrollment in Affiliated Colleges



4.3.9 Technology (Cyber Security, Robotics, Artificial Intelligence, Nanotechnology, Cloud Computing and Big Data, Aeronautics and Manmade Material)

The Pakistan Vision 2025 identified six technologies that are likely to drive the future of development in the country, namely: micro-electronics, computers, telecommunications, human-made materials, robotics, and biotechnology. Specifically, the growth in ICT has shifted the world to a virtual space, particularly for the delivery of services, and has given birth to a new global operating model for businesses[70].

The various environmental hazards of ICT, from production/manufacturing, distribution, consumption/operations and disposal stages have been categorized as climate change, ozone depletion, terrestrial acidification, freshwater and marine eutrophication, human toxicity, photochemical oxidant formation, terrestrial, freshwater and marine ecotoxicity,

[70] Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk

particulate matter formation, metal depletion and fossil depletion, agricultural and urban land occupation, natural land transformation and ionizing radiation[71].

Regarding the electronic waste (e-waste), Pakistan is at the receiving end of the "e-waste divide" due to widespread poverty and sharp inequality. Some may even see this as evidence of our greater ability to use and reuse material items more effectively. Yet this inconsiderate attitude that results in e-waste dumping is already emerging as one of the major hazards to the health of both the environment and the people[72]. The health and environmental hazards associated with e-waste are mostly due to electronic goods containing significant quantities of toxic metals and chemicals. Pakistan faces the problem mainly on two fronts: on the one hand, it is used as the dumping ground for over 50,000 tonnes of e-waste by developed countries and, on the other, it generates thousands of tons of local e-waste every year. Karachi is a major dumping ground for e-waste from Pakistan and all over the world. The workers, mostly women and children, are exposed to all sorts of toxins. The waste generated by this industry is dumped in the Lyari River in Karachi, and eventually finds its way into the Arabian Sea, where it contaminates the marine ecosystem. Some of the waste is dumped in landfills, where it contaminates the soil and such landfill sites are also not properly administered[73].

[71] Yevgeniya Arushanyan. 2016. Environmental Impacts of ICT: Present and Future. Doctoral Thesis. Royal Institute of Technology. Stockholm, Sweden.
[72] Global Information Society Watch. 2010. https://giswatch.org/sites/default/files/pak-listo.pdf
[73] Global Information Society Watch. 2010. https://giswatch.org/sites/default/files/pak-listo.pdf

5 Stakeholder Consultation and Information Disclosure

This chapter describes the objective, process, and outcome of the stakeholder consultations carried out before or during the preparation of Environmental and Social Management Framework (ESMF).

5.1 Requirement of Stakeholder Consultation

The Bank recognizes the importance of early and continuing engagement and meaningful consultation with stakeholders. The Bank will require the HEC to engage with stakeholders, including communities, groups, or individuals affected by proposed projects, and with other interested parties, through information disclosure, consultation, and informed participation in a manner proportionate to the risks to and impacts on affected communities. The Bank will have the right to participate in consultation activities to understand the concerns of affected people, and how such concerns will be addressed by the HEC in project design and mitigation measures. The Bank will monitor, as part of its due diligence, the implementation of consultation and stakeholder engagement by the HEC.

It is important to consult stakeholder before and during the preparation of ESMF and document the consultation outcomes. This consultation is considered very important to validate the potential risks and impacts identified in the ESMF.

5.2 Process of Stakeholder Consultation

The HEC will undertake a process of meaningful consultation in a manner that provides stakeholders with opportunities to express their views on project risks, impacts, and mitigation measures, and allows the HEC to consider and respond to them. Meaningful consultation will be carried out on an ongoing basis as the nature of issues, impacts and opportunities evolves. Meaningful consultation is a two-way process, that:

a. Begins early in the project planning process to gather initial views on the project proposal and inform project design;
b. Encourages stakeholder feedback, particularly as a way of informing project design and engagement by stakeholders in the identification and mitigation of environmental and social risks and impacts; Continues on an ongoing basis, as risks and impacts arise;
c. Is based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information in a timeframe that enables meaningful consultations with stakeholders in a culturally appropriate format, in relevant local language(s) and is understandable to stakeholders;
d. Considers and responds to feedback;
e. Supports active and inclusive engagement with project-affected parties;
f. Is free of external manipulation, interference, coercion, discrimination, and intimidation; and
g. Is documented and disclosed by the HEC

Research proposal activities as well as the interventions related to small works will have to duly go through the consultation process during the reparation stage following the World Bank consultation standards.

5.3 Identification of Stakeholders

'Stakeholder' refers to individuals or groups who:

a. are affected or likely to be affected by the project (*project-affected parties*); and
b. may have an interest in the project (*other interested parties*)

For HEDP, the primary stakeholders include the Higher Education Commission, the Universities, Accreditation Councils, Affiliated Degree Colleges, Teacher Academies in KPK and Baluchistan and teacher training institutes in other Provinces; Examination Boards, Textbook Boards; students and teachers of the concerned institutions.

5.4 Environmental & Social Management Framework (ESMF) Consultation and Disclosure

The consultation is required with the stakeholders regarding the potential environmental and social risks and impacts of the proposed project/subprojects as part of the ESMF document before or during its preparation. At this point in time, the detail about the project/subprojects and their exact locations are not known, therefore, it is not possible to engage community/stakeholders and carry out the consultation for those projects which are unknown.

The ESMF shall be finalized in the light of these stakeholder consultations.

5.5 Summary of the Stakeholder Consultations

Primary stakeholders and beneficiaries of the HEDP program include Faculty and researchers from universities; Universities' administrative staff (registrars, treasurers, QECs, and ORICs); graduate and undergraduate students at universities; and Principals, administrative staff, faculty and students from Affiliated Colleges. HEC has used guidance and advice of the members of the higher education community of Pakistan throughout the development of this project and its underlying activities.

An overview of the pertinent consultations held in regard to the project design and activities, their social implications and the Environmental and Social Management Framework (ESMF) is presented below. Prior to consultations, the ESMF document, after review by the World Bank team, was placed on the HEC website on March 27, 2019 with an invitation to visitors to share their comments and suggestions on the document. The ESMF can be accessed through the link:
http://www.hec.gov.pk/english/HECAnnouncements/Pages/ESMF-AGAHEE.aspx

5.5.1 Consultation with the Universities (April 10, 2019)

A three hour consultation was held on April 10, 2019, with participants from 36 Public Universities from all across Pakistan. The list of participants and photographs are provided as Annexure 7. Most of the interventions planned under the project impact public universities, hence they were targeted primarily for this consultation. A representative sample of the universities was selected which included a mix of large, medium and smaller universities; comprehensive as well as research universities; and universities from both metropolitan and smaller cities. All the public sector women universities (general) in Pakistan had been invited to participate, out of which 11 participated. Participants from each university comprised of their registrars, treasurers, staff from Quality Enhancement Cells (QECs) and Offices of Research, Innovation and Commercialization (ORICs), female and male faculty, and students.

During the consultation, the participants were first briefed on each project component and its sub activities, and the Environmental and Social Management Framework (ESMF). The briefing on ESMF was conducted by Mr. Shafqat Ullah of Cleaner Production Institute. He was supported by Dr. Muhammad Zafar Khan, Associate Professor Karakorum International University, and Ms. Mehrunisa Malik during the consultation process as the Environment and Social Specialists respectively on behalf of HEC. Following the briefings, questions, concerns and suggestions from the participants were invited. The feedback received on the project activities and ESMF and responses by HEC project team were recorded.

5.5.2 Consultation with the Affiliated Colleges and representatives of the Higher Education Departments (April 11, 2019)

Representatives of the Higher Education Departments (HEDs) from four provinces (Punjab, Sindh, Balochistan, Khyber Pakhtunkhwa) were invited to participate in the consultation exercise along with the principals, faculty and students from at least 4 public Affiliated Colleges (2 of each, male and female) of their province. The three hour consultation on April 11, 2019 was attended by HED officers and principals, administrative staff, faculty and students of Affiliated Colleges from Punjab, Balochistan and Khyber Pakhtunkhwa. Registrars and staff of QECs of several public universities also joined this consultation. The list of participants and photographs are provided as Annexure 8.

The consultation opened with a detailed briefing on the Component 2 of the project i.e. "**Supporting Decentralized Higher Education Institutes for improved teaching and learning"**. The participants were informed that as per the environmental assessment done for the project the Environmental risk associated with activities under this component is low, and the ESMF document that will be used for the regulation during this project can be accessed at HEC website. They were requested to share their comments and concerns in regard to ESMF on HEC website. Following the briefings, questions, concerns and suggestions from the participants were invited. The feedback received on the project activities and ESMF and responses by HEC project team were recorded.
The overall response received from the participants from both consultations was favorable and in overwhelming support for the activities planned in the project.

5.5.3 Summary of Consultations and HEC Response

The comments and concerns received from the participating stakeholders during the above consultations along with the response from HEC team are summarized below:

Table 18: Summary of Stakeholder Consultations

April 10, 2019			
Sr. No.	**Comment**	**Participants' Affiliation**	**HEC response**
1.	The sustainability of the investment made through this huge loan should be ensured.	Balochistan University of Information Technology, Engineering, and Management Sciences (BUITEMS); Quetta, Balochistan	• The activities intended through the project are strategized according to HEC's own plan and vision for the next 5 years, and are designed to build on HEC's previous and existing programs. • To ensure the sustainability of the activities involving investment in Affiliated Colleges, HEC has been involved in discussions with the provincial HEDs to negotiate and reach an understanding with the provincial governments for support of the project. Provincial HEDs from all provinces have conveyed their initial support for the activities plan under the project.
2.	Smaller and relatively younger research universities might get overlooked during selection of lead universities under GCF grants.	Balochistan University of Information Technology, Engineering, and Management Sciences (BUITEMS); Quetta, Balochistan Government College University, Faisalabad	• GCF grant is designed to encourage and support collaborative research. HEC has not identified the set of universities which can assume lead roles in the consortiums, however, the criteria for the lead university will be laid down such that labs with higher research potential and experience receive that role. Through this grant, researchers from smaller and younger universities can link up with experienced researchers and advanced labs in large universities. It will be an opportunity for smaller and younger universities to improve their research prowess through seeking mentorship and benefiting from facilities available at larger research universities. The grant will be shared by the members of the consortium as laid out in their joint

			proposal. HEC will also facilitate universities in building or joining consortiums through networking events. Collaborative design of this grant ensures that every kind of research institution will have the opportunity to benefit from this grant.
3.	HEC's own capacity and resources to successfully deliver extensive programs for the expanding higher education sector needs to be looked into and improved.	The University of Punjab (PU), Lahore	• The suggestion was noted and well received. For the program under-consideration, capacity building of existing HEC staff, as well as their support through consultancies and recruitment of additional staff is included.
4.	Community Colleges and AD programs, are unfamiliar and new concepts for our HE sector, so their roadmaps should be clear and flexible; with unambiguous exit and entry points for universities and students to exercise.	The University of Punjab (PU), Lahore Government College Women University, Faisalabad	• The suggestion is useful and will be taken into consideration during development of curriculum and guidelines.
5.	Elaborate the enhanced role of Universities in regard to Affiliated Colleges.	University of Haripur, Khyber Pakhtunkhwa	• HEC has reviewed the work load and capacity of the existing QECs. Considering that, capacity building activities, as well as designation of specific HR for ACs has been planned in the project. AU QECs will work in close partnership with trained "changed teams" from ACs.

6.	Universities should be able to volunteer for the HEMIS; and choose to request upgradation of their existing ERP systems.	UET Peshawar, Khyber Pakhtunkhwa	• This is already under serious consideration, and will be definitely supported in the project implementation strategy.
7.	The efficiency and time management for implementation of the research grants will be a critical challenge and should be taken care of.	Islamic International University, Islamabad	• HEC has planned to automate the grants application process. The year before the launch of grant will be used as a preparation year; and the automation process, the criteria for award of grants, application review mechanism, selection of reviewers etc. will be put in place.
8.	HEC already regularly undertakes curriculum revision exercise for academic programs, the exercise under this project will be different, how?	Islamic International University, Islamabad	• The exercise under this project will mainly focus towards the BS and AD degrees. HEC has already initiated the process to restructure the 4 year undergraduate program in order to enhance quality. The overall objective of HEC revamping undergraduate curriculum is to prepare the students and develop critical and analytical thinking, evidence-based observation, a deeper sense of civic and social rights and responsibilities in them
9.	How social sciences research will be encouraged and supported through these grants?	Government College Women University, Faisalabad	• Social Sciences and humanities themes have been specifically identified for support under GCF grants. Additionally, LCF and ISF grants are also equal opportunities for social scientists to apply, where grants will be awarded primarily on the strength of proposals and relevance of research question.
10.	Support and guidance for researchers undertaking research on	Lahore College for Women University	• HEC will hire an Environmental Specialist to facilitate implementation of the ESMF. He/she will be available to guide and advise the researchers applying for grants under this project.

	environmental issues , natural sciences , chemicals etc., where ESMF is applicable should be available at HEC.		
11.	Accreditation Councils, industries and prospective employers including Public Service Commissions, should be engaged in the development of AD curriculum. Additionally, a sunset strategy for sub-par and irrelevant programs should be imposed.	IBA-Sukkur, Sindh	• That is the current practice in HEC, and will be seriously considered during the curriculum development exercise under this project. • AD and BS programs will replace the obsolete and irrelevant 2-year programs ultimately.
12.	Several national and provincial technical education institutions already exist in Pakistan, how will they be engaged in the Community College initiative.	Islamia University Bahawalpur, Punjab	• The AD programs and the training programs for the community colleges will be developed in consultation with the technical education institutions such as NAVTTC and other provincial counterparts.
13.	Introduction of BS programs and technological advancement in ACs will impact	Lahore College for Women University, Punjab	• This is a valid concern. The scope of this program does not extend to provision of scholarships to AC students, however, this will be first intervention of this scale towards improving opportunities of education

	the fees that students will have to pay for enrollment. Whereas, the national programs for fee reimbursement generally do not extend to students of ACs.		for students and staff development at ACs. • HEC can bring up this issue for consideration of the provincial governments during its discussions with them.
14.	The technology advancement activities including the smart classrooms initiative is appreciable. However, colleges should be selected depending on their need for such facilities. Farther colleges where such facilities might have more impact may be preferred.	University of Turbat, Balochistan	• The suggestion is noted and will be considered while developing the criteria for selection. HEC plans to circulate EoI to colleges through HEDs and AUs for showing interest in being selected for this intervention.
April 11, 2019			
Sr. No.	**Comment**	**Participants' Affiliation**	**HEC response**
15.	The career options for Community Colleges and AD programs should be clearly thought out and publicized, so students are	Govt. College for Women Township Lahore Fatima Jinnah Women University, Rawalpindi	• The suggestion is noted, and will be seriously considered during development of curriculum for these programs. The AD program will be structured such that it is vertically aligned with the BS program with clear entry points.

	aware of the opportunities available for them.		
16.	The 4 year BS program that is currently being offered in the ACs has a hybrid semester/annual system. A considerable portion of examination is conducted by the AUs which results in delay in completion of degrees. The structure of BS program at ACs needs improvement such that the students can graduate in 4 years' time. HEC may look into introducing a uniform academic calendar in universities and colleges for BS programs.	M.A.O. College Lahore University of Veterinary and Animal Sciences, Lahore	• The concern has been noted, and will be taken into consideration during development of the BS program and its implementation in ACs.
17.	The AD program will be beneficial for female students in ACs, who due to pressure from families drop out of BS programs earlier. HEC	Govt. Postgraduate College for Women Samanabad, Lahore	• The valuable advice has been noted. The principals and faculty from women colleges will be consulted during the AD programs development process to take this suggestion into consideration.

	may look into rolling out AD programs in women colleges first and in disciplines preferred by female students.		
18.	The existing BS programs in ACs were commenced by the provincial governments without seeking consultation from the AUs. HEC will need to guide the provincial governments in this regard.	University of Balochistan Quetta	• The AUs, ACs, and provincial HEDs will be included in the consultation process for development of BS program in ACs under this project. The concern raised by the University will be deliberated with provincial HEDs during negotiations to institute quality in programs offered in ACs.
19.	The capacity building activities planned for the college staff are a commendable initiative. However, the roles and policies for QECs and change teams need to be very clear. The staff at colleges is frequently transferred between colleges, this can be challenging in formation of "change teams".	Queen Mary College for Women, Lahore Shaheed Benazir Bhutto Women University, Peshawar	• The concern and suggestion have been noted, and will be considered during the project implementation.

20.	Electricity and power outages are huge challenge in Balochistan. This can pose a huge challenge in deriving benefits from the technology interventions. Moreover, technical skills should be developed at ACs to maintain and support the usage of technology.	Directorate of Colleges, HED, Balochistan	• This is indeed a concern and HEC has been looking into options to mitigate the power availability challenge in expansion of PERN and allied services to remote areas. This issue will be taken into consideration while deliberating selection of colleges for Smart Classrooms and Smart Campus initiatives.
21.	While revision of Affiliation Criteria, HEC may consider setting a cap on the no. of colleges that a university can affiliate. Moreover, Affiliation Criteria should be made more stringent.	Balochistan University of Information Technology, Engineering, and Management Sciences (BUITEMS); Quetta, Balochistan IBA-Sukkur, Sindh	• Provincial HEDs and AUs decide which college will be affiliated with a university. However, HEC will look into a possible means for addressing this issue.
22.	HEC may look into restricting colleges in remote areas to AD programs only, as commencement of BS program is a huge challenge in those areas due to lack of	University of Hazara, Khyber Pakhtunkhwa Govt. Degree College Kurri Road, Quetta	• The concern and suggestion have been noted, and will be considered during the project implementation.

	qualified faculty. In addition, AD programs at ACs should be similar to programs offered in their AU, so bridging into BS program may become easier for students.		
23.	Affordability of BS programs is a huge concern for students in Affiliated Colleges.	University of Balochistan, Quetta Govt. Degree College Kurri Road, Quetta	• This is a valid concern. The scope of this program does not extend to provision of scholarships to AC students, however, this will be first intervention of this scale towards improving opportunities of education for students and staff development at ACs. • HEC can bring up this issue for consideration of the provincial governments during its discussions with them.
24.	Representation of colleges from Sindh should be ensured as well.	IBA-Sukkur, Sindh	• HEC has been persistently requesting provincial higher education department in Sindh for their support and participation in discussions. The Secretary, Universities and Board did attend the initial meeting with provincial HEDs in regard to this project. • HEC definitely wants proportionate representation of colleges and universities from Sindh in this project.

5.6 Requirement of World Bank for Public Consultation

For all Category B projects proposed for International Bank for Reconstruction and Development (IBRD) or International Development Association (IDA) financing, during the environmental assessment (EA) process, the HEC consults project-affected groups and local nongovernmental organizations (NGOs) about the project's environmental aspects and takes their views into account. The HEC initiates such consultations as early as possible.

5.7 Requirements of Public Consultation by Pakistan Environmental Protection Agency

After the 18th amendment in 2010, the power to legislate and decide on the subject of "environmental pollution and ecology" now lies with the provincial government, however, "climate change" remains under federal jurisdiction.

The Pakistan Environmental Protection Act 1997 (PEPA 97) is the apex environmental law in the country, and provides for the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and for promotion of sustainable development. Section 12 of the Act requires preparation of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) before commencement of projects likely to cause adverse environmental effects. Immediately after 18th amendment the provinces adopted PEPA 1997 with amendments.

Environmental protection acts relevant to all the anticipated projects or subprojects include following:

1. Pakistan Environmental Protection Act (For Islamabad and Federally Administered Tribal Areas)
2. Punjab Environmental Punjab Environmental Protection Act (Amendment 2012) Sindh Environmental Protection Act 2014
3. Balochistan Environmental Protection Act 2013
4. KPK Environmental Protection Act 2014

The relevant sections of environmental assessment (IEE and EIA) in provincial acts is given in Table 19**.**

Table 18: Pakistan Environmental Acts Relevant Sections

Act	IEE/EIA Section
Punjab Environmental Protection Act (Amendment 2012)	Section 12
Sindh Environmental Protection Act 2014	Section 17
Baluchistan Environmental Protection Act 2013	Section 15
KPK Environmental Protection Act 2014	Section 13
Pakistan Environmental Protection Act (For Islamabad and Federally Administered Tribal Areas)	Section 12

These Regulations define procedures for preparation, review and approval of environmental assessments which has been adopted by all the provinces. The projects falling under any of the categories e.g. the project requiring Initial Environmental Examination (IEE) report, Environmental Impact Assessment (EIA) report or any other legally applicable reports, have to fulfill requirements of both bank and local regulatory requirement. Public hearing IEE/EAI is one of the essential requirements under federal and provincial Environmental Protection Acts

5.9 Disclosure

For meaningful consultations between the HEC and project affected groups and local NGOs on all Category B projects proposed for IBRD or IDA financing, the HEC provides relevant material in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted.

Any separate Category B report for a project proposed for IDA financing is made available to project affected groups and local NGOs. Public availability in the borrowing country and official receipt by the Bank of Category A reports for projects proposed for IBRD or IDA financing, and of any Category B EA report for projects proposed for IDA funding, are prerequisites to Bank appraisal of these projects.

Once the HEC officially transmits any separate Category B EA report to the Bank, the Bank makes it available through its website.

6 Potential Environmental & Social Impacts Assessment and Mitigation Measures

There are two types of sub-projects that result environmental and social impacts, these are; the research projects, and small construction activities. This chapter describes potential generic environmental and social risks and impacts (direct, indirect/induced and cumulative) associated with the proposed project and its components which needs to be managed during designing and operational phases.

The proposed project aims to support the Government of Pakistan in strengthening the tertiary education system in the country. The project will support the innovative strategic research through competitive financing under:

1. Grand Challenge Fund (GCF);
2. Innovator Seed Fund (ISF); and
3. Technology Transfer Support Fund (TTSF)
4. Local Challenge Fund

It is anticipated that the proposed project will support research under following major categories of research areas through above mentioned funding arrangements:

a. Arts, Humanities, Social Sciences and Economics;
b. Business and Management;
c. Physical, Biological, and Earth Sciences;
d. Engineering and Technology;
e. Energy and Renewable Energy;
f. Waste Recycling;
g. Climate Change Resilience [Disaster] and Environment
h. Medical, Health, and Nutritional Sciences; and
i. Agriculture, Livestock and Fisheries.

It is also anticipated that research under category ‘a’ and ‘b’ may not have any adverse environmental and social impacts, however the others may have negative environmental and social impacts. The research activities may involve laboratory or field-based research work. The research projects seeking funds, need to comply with World Bank’s safeguard policies established by this ESMF, in addition to conformity with environmental legislation of the Government of Pakistan and Provincial Governments.

At this stage the type, extent and exact locations of the proposed project(s) and subproject(s) are not known and may not be known at the appraisal stage and the requirement to carry out a detailed environmental and social analysis as part of the project implementation phase may not be fulfilled. However, to identify potential environmental and social impacts at proposal screening stage for any project(s) or subproject(s), a limited environmental and social analysis/screening seems essential and need to be done

during project approval for funding. Following is the environmental and social screening guidelines for the proposed project(s) and subproject(s):

6.1 Environmental and Social Screening:

The project activities with potential environmental and social impacts s will be screened through following two windows:

c) Research projects: The research projects screening by HEC will include the following: [but not limited to]:
   - Identification of possible environmental and social impacts of the proposed project(s) and subproject(s). In some cases, this could be limited t a simple assessment of laboratory facilities and their experience on laboratory. The checklist for such research proposals is attached as [Annexure 4].
   - As part of the same screening process, HEC will also determine the proposed research project(s) and subproject(s) which can be categorized under the Pakistan Environmental Protection Agency (Review of IEE and EIA) Regulations, 2000 [Annexure 1], have to fulfill the applicable legal requirements including either Initial Environmental Examination [IEE], Environmental Impact Assessment [EIA] or any other applicable requirement; and

d) Small Works projects:
   - The proponent of the proposed project(s) and subproject(s) involving infrastructure renovation and/or refurbishing construction works, fulfilling eligibility criteria for funding, have to be screened through checklist [Annexure 2]. This screening is intended to identify the activities that may have environmental and social impacts. The specific measures that should be taken into consideration while evaluating such project(s) and subproject(s) proposals are attached as [Annexure 3]. These measures will also be included as part of the bidding documents of contractors and in the documents that award the grants.

6.2 Project Activities

Table 20 describes project components and associated activities which could result into potential environmental and social risks and impacts.

Table 19: HEDP Project Components and Associated Activities

#	Project Components	Proposed Activities
1	Component 1: Nurturing Excellence in Strategic Sectors	Activity 1: Stimulating excellence in research. The categories of research areas may include following: a. *Physical, Biological, and Earth Sciences;* b. *Engineering and Technology;* c. *Energy and Renewable Energy;* d. *Waste Recycling;* e. *Climate Change Resilience [Disaster] and Environment* f. *Medical, Health, and Nutritional Sciences; and* g. *Agriculture, Livestock and Fisheries.*
2	Component 2: Supporting Affiliated Colleges to provide Mid-Level Skills	Activity 2A. Strengthening the Affiliation Mechanisms Activity 2B: Aligning curricula to the labor market Activity 2C: Faculty Training Activity 2D: Interacting with the Socio-economic Environment
3	Component 3: Equipping Students and Higher Education Institutions with Modern Technology	Activity 3A: Update the existing strategy and policies on technology Activity 3B: Connecting affiliated colleges and enabling technology enhanced learning Activity 3C: Expanding the service offer of HEC and PERN
4	Component 4:	Higher Education Management Information System (HEMIS)
5	Technical Assistance	Activity 4A: National Academy for Higher Education (NAHE) Activity 4B: Improving the research management system Activity 4C: Diversifying funding streams of universities and HEC

6.3 Potential Environmental Impacts and Associated Mitigation Measures

Table 21 presents generic [but not conclusively] potential environmental aspects and impacts of the anticipated project(s) and subproject(s) activities.

The mitigation measures of the significant environmental and social impacts [if identified] will be required from the project(s) and subproject(s) proponent in the form of a comprehensive impact mitigation plan. The plan must include following [but not limited to] information to meet the appraisal requirements:

- ❑ Project phase
- ❑ Identified Significant Environmental and Social Aspects and Associated Impacts
- ❑ Proposed Mitigation Measures
- ❑ The Monitoring Parameters
- ❑ The Monitoring Frequency
- ❑ Roles and Responsibilities
- ❑ Compliance Criteria

Table 20: Environmental Aspects and Potential Impacts

#	Project	Activities	Actions to be taken	Environmental and Social Aspects to be taken into Consideration	Potential Environmental Impacts
1	Component 1: Nurturing Excellence in Strategic Sectors	Activity 1A: Stimulating excellence in research. The categories of research activities may include following: a. *Physical, Biological, and Earth Sciences;* b. *Engineering and Technology;* c. *Energy and Renewable Energy;* d. *Waste Recycling;* e. *Climate Change Resilience [Disaster] and Environment* f. *Medical, Health, and Nutritional Sciences; and*	<u>Under Activity 1A:</u> 1. Finance the innovative strategic research through following competitive financing: • *The Grand Challenge Fund (GCF)*: [for selected public and private universities; critical societal and economic challenges; individual faculty staff on specific themes aligned with national priorities] • *The Innovator Seed Fund (ISF)*: [for selected public and private universities; students and faculty staff; to bring innovative product or service to the market] • *The Technology Transfer Support Fund (TTSF)*: [for public university departments and faculties; research projects in partnership with private companies	1. The generic indirect environmental and social aspects need to be taken into consideration while financing actions under Activity 2A. While financing such projects, the proponent [the one who submits proposal for the project and seeks approval and finance] must address significant environmental and social aspects at all the development and operational stages of the proposed project/s. 2. The proposed project/s should only be financed under any of the competitive financing if these provide environmental and social management plans addressing [but not limited to] followings: • Vegetation including trees, plants, crops etc. • Natural Habitats including terrestrial, freshwater, or marine	• No direct, physical, environmental impacts can be anticipated for actions under Activity 1A. • The significant environmental impacts that need to be taken into consideration while financing actions under Activity 2A. No project/s should be financed under any of the competitive financing which do not provide and implement environmental management or mitigation plans for the following [but not limited to] significant environmental impacts at any stage [development and operational]: • <u>Vegetation:</u> Loss of top soil, air pollution, soil erosion, loss of aesthetic of the area

		g. *Agriculture, Livestock and Fisheries.*	and in specific fields of national interest] • *Local Challenge Funds (LCF):* This will encourage the Tier 2 universities/Higher Education Institutes to establish and strengthen their research capacities by competing for research grants for research solutions for pressing socio-economic problems within the district or locality that the university is located in.	geographical unit or airway that supports assemblages of living organisms and their interactions with the nonliving environment. • Physical Cultural Resources (PCRs) • Air Quality including fugitive emission and/or point source emissions. • Wastewater [having or may have pollution parameters exceeding legally applicable limits] • Storage and disposal of Solid and Hazardous Waste • Noise • Occupational health and safety [OH&S] concerns of employees and workers involved and the nearby community/passersby • Social and economic baseline of the project area	• Natural Habitats: Loss of natural habitats and biodiversity • Physical Cultural Resources (PCRs): Loss of PCRs at the project sites • Air: Air pollution resulting in poor visibility, loss of vegetation, property damages, acid rain, soil contamination and health implications on workers and nearby community • Wastewater: Soil and water contamination, odor, health implications (due to breeding of mosquitos and flies), and nuisance due to improper treatment and disposal of sanitary wastewater from construction camps. • Solid Waste and Soil Contamination: Nuisance, health implications on workers and community (due to breeding of mosquitos and flies) (if not disposed/treated

					properly). Soil contamination due to improper disposal of hazardous solid waste. • Noise: Nuisance, health implications on workers and nearby community, loss of biodiversity. • Occupational Health and Safety [OH&S]: Safety hazards for workers and community. • Social and economic baseline of the project area
2	Component 2: **Component 2: Supporting Decentralized Higher Education Institutes for improved teaching and learning**	Activity 2A: Strengthening the Affiliation Mechanisms Activity 2B: Aligning curricula to the labor market Activity 2C: 2.5: Connecting Affiliated Colleges to Pakistan Education and Research Activity 2D: Interacting with the Socio-economic Environment Activity 2E:	Under Activity 2A: Revise and Make Pro-Active affiliation mechanism for ACs. Under Activity 2B: 1. Revise the curricula for 2-year Associated Degree and 4-year BS Degree programs. 2. Make degree programs consistent with the semester and credit structures, and align assessment methods related with the new structures. Under Activity 2C: 1. Provide training [through AUs] to ACs faculty on content knowledge in line with the new curriculum.	1. No direct, physical, environmental aspects can be anticipated for actions under Activity 2A, 2B, 2C, 2D and 2E. Wherever relevant environmental and social aspects should be incorporated in the revised curricula. 2. Environmental and social aspects should be made part of the faculty training.	1. No direct, physical, environmental impacts can be anticipated for actions under Activity 2A, 2B, 2C, 2D and 2E. 2. Proposed environmental and social actions will directly and indirectly positively contribute in the environmental enhancement.

		Improving Monitoring and Evaluation	Under Activity 2D: 1. Engage employers and civil society through a Quality Enhancement Cells [QECs] of AUs for curriculum revision and for special training sessions to share their professional experiences. Involve employers in designing new internship programs for ACs. 2. Perform consultative M&E activities by engaging QECs and M&E specialists to provide quality assessments, trainings, and coaching to ACs and Tier 2 AUs.	3. Environment and social issues being run across all the subjects therefore, it should be made integral part of QECs of AUs and environmental and social internships should also be included. 4. M&E activities should also include environmental and social monitoring of project activities and actions.	
3	Component 3: Equipping students and higher education institutions with modern technology	Activity A: Update the existing strategy and policies on technology Activity C: Expanding the service offer of HEC and PERN	Under Activity 3A: 1. Revision and updating of existing Information and Communication Technology [ICT] strategy Under Activity 3B: 1. Modernize selected ACs through Pakistan Education & Research Network [PERN] connectivity and Eduroam. 2. Support to develop and equip smart classrooms,	1. No direct, physical, environmental and social aspects can be anticipated for actions under Activity 3A, 3C, and 3D. 2. The generic indirect environmental and social aspects need to be taken into consideration while financing actions under Activity 3B. This activity may include networking, cabling, and development of data centers having power consuming equipment e.g.	1. No direct, physical, environmental and social impacts can be anticipated for actions under Activity 3A, 3C, and 3D. 1. The significant environmental and social impacts that need to be taken into consideration while financing actions under Activity 3B. No project/s should be financed under any of the competitive financing which do not provide and implement

	Component 4: Higher Education Management Information System (HEMIS		virtual classrooms, and distance learnings. 3. Offer relevant capacity building trainings to AUs an ACs. Under Activity 3C: 1. Develop an online market-place for relevant software e.g. LMS software, research software, anti-plagiarism software. The web services, provision of cloud storage, and cluster computing, etc. Under Component 4: 1. Dialogue with the HEIs to select indicators for data collection through HEMIS. 2. Develop a comprehensive strategy for data collection. 3. Train relevant staff in Quality Enhancement Cells [QECs] to feed and access their data into the HEMIS system. 4. Digitization of University Administration	servers, CPUs, RAMs, HVAC systems etc. While financing such projects the proponent [the one who submits proposal for the project and seeks approval and finance] must address significant environmental and social aspects at all the development and operational stages of the proposed project/s.	environmental and social management or mitigation plans for the following [but not limited to] significant environmental impacts at any stage [development and operational]: • <u>Air:</u> Air pollution resulting in poor visibility, loss of vegetation, property damages, acid rain, soil contamination and health implications on workers and nearby community • <u>Wastewater:</u> Soil and water contamination, odor, health implications (due to breeding of mosquitos and flies), and nuisance due to improper treatment and disposal of sanitary wastewater from construction camps. • <u>Solid Waste and Soil Contamination:</u> Nuisance, health implications on workers and community (due to breeding of mosquitos and flies) (if not disposed/treated

					properly). Soil contamination due to improper disposal of hazardous solid waste. • Noise: Nuisance, health implications on workers and nearby community, loss of biodiversity. • Occupational Health and Safety [OH&S]: Safety hazards for workers and community. • Social and economic baseline of the project area
4	:Technical Assistance	Activity A: Support in developing National Academy for Higher Education (NAHE) Activity B: Improving the Research Management System Activity C: Diversifying funding streams of universities and HEC	Under Activity 4A: 1. Support HEC in developing and delivering international standard training programs for AUs and AC. Under Activity 4B: 1. Support capacity development of the research evaluation panels [quality assurance under Component 1]. 2. Support mechanisms of partnering with lead researchers and practitioners to strengthen the communities of practices and learning in various sectors.	1. No direct, physical, environmental and social aspects can be anticipated for actions under Activity 4A, 4B, and 4C.	2. NO direct, physical, environmental impacts can be anticipated for actions under Activity 4A, 4B, and 4C.

			Under Activity 4C: 1. Support capacity development for universities and the HEC in diversification of funding streams, as well as analytical work on the diversification of funding and endowment building strategies.		

6.4 Perceived Social Impacts and Mitigation Measures

Being a project focusing on education, HEDP has numerous benefits related to improving the quality of higher education and research in Pakistan. However, given the diversity and spread of this project, there is a risk that project activities will not be socially inclusive and equitable. The possible social risks associated with HEDP relate to gender exclusion, geographical exclusion, discrimination and inability of the project to contribute towards solving societal and economic problems.

Moreover, The Local Challenge Fund under Component 1 will provide grants for research to tackle pressing socioeconomic challenges within any given district or locality that the university is located in. The grant will be open to research addressing any of the seventeen Sustainable Development Goal targets, with a focus on adapting solution to the local district/division level in Pakistan. Since the fund is competitive and open to all universities (including the University of Chitral), there is a possibility that grant applications may be received for research focusing on Kailash people, valleys or land. Keeping this in view, OP 4.10 on Indigenous People has been triggered as a precaution. An IPPF has been prepared for the Project, using two recently developed IPPF for World Bank financed KP Integrated Tourism Development Project (KITE), and KP Irrigated Agriculture Productivity Improvement Project (KPIAP). Both these IPPF's address research areas which the research grants component Local Challenge Fund will target. Typically, all such areas which fall under SDG's (which are the main focus for the Higher Education Research) are covered in these two IPPF's (for example livelihoods, tourism, land, culture, agriculture, horticulture, livestock, education, health, water, climate change and biodiversity). The opportunities and challenges under each have been explored and consulted upon. Hence the IPPF prepared for HEDP will only guide research grants for issues covered and consulted upon within the IPPF of HEDP. In addition, all such requests will need to be vetted by the World Bank (under guidance of OP 4.10) and will be required to acquire all necessary and relevant clearances from the Bank. This due diligence will be carried out before initiating any type of review process by any entity.

The social risks associated with each component of HEDP are presented in **Table 22** below. **Table 23** provides perceived social impacts for each proposed activity under HEDP along with recommended mitigation measures.

Table 21: Perceived Social Risks

Project Component	Social Risk
Component 1: Nurturing Excellence in Strategic Sectors	Moderate risk of gender exclusion, geographical exclusion, and inability of the project to contribute towards solving societal and economic problems.
Component 2: Supporting Decentralized Higher Education Institutes for improved teaching and learning	Moderate risk of gender exclusion, and geographical exclusion.

Component 3: Equipping Students and Higher Education Institutions with Modern Technology	Limited to low social risk
Component 4: Higher Education Management Information System and Data Driven Services	Limited to low social risk
Component 5: Capacity Building, Project Management, Monitoring and Evaluation	Limited to low social risk

Table 22: Perceived Social Impacts and Mitigation Measures

Component/Sub-Component	Perceived Social Risk	Recommendations
Component 1 - Nurturing Excellence in Strategic Sectors		
Sub-component 1.1: Promoting Innovative and Relevant Research	Gender exclusion; grants for the Grand Challenge Fund and the Technology Transfer Support Fund may primarily go to male investigators	Encourage female applicants to apply for grants through bridging workshops to improve research skills. Women researchers should be involved in the consultative process for determination of eligibility criteria and format of the workshops.
		Encourage female applicants to apply for grants by providing mentorship opportunities if chosen. Mentors will be established researchers from top universities who will provide guidance on the chosen research. A list of mentors for each thematic research should be prepared by HEC for this purpose
	Geographical exclusion; grants for the Grand Challenge Fund and the Technology Transfer Support Fund may exclude universities in historically underserved areas	Ensure that universities in historically underserved areas (Balochistan, South Punjab etc.) are aware of these grants and encouraged to apply
		Provide incentives (such a grant size) for collaborative research between well established research universities/Tier 1 universities, and smaller universities in underserved areas
	Discrimination; grants for Grand Challenge Fund and the Technology Transfer Support Fund may discriminate against gender, religion or ethnicity	Grants criteria and applications must clearly state that equal opportunity will be given to all applicants regardless of gender, race, ethnicity and religion.

Component/Sub-Component	Perceived Social Risk	Recommendations
	Research conducted using grants from the GCF and TTSF may be of poor quality and not contribute towards solving societal and economic problems.	Evaluation criteria must clearly list the sectors of national priority based on Pakistan Vision 2025 and HEC Vision 2025 to ensure relevance HEC must use their platform to collect and analyze data on past research trends to identify gaps in chosen themes and align evaluation criteria to ensure grants are provided for research ideas with higher chances of applicability Research proposals must include plans and budgets for commercialization and outreach Grants proposals should include potential for continued revenue generation from research by the university through licensing fees, patents, royalties and equity stakes in start-up businesses. Evaluation criteria should favour high impact relevant research publications over sheer quantity of research publications by applicants To limit individual research, HEC should provide incentives in terms of grant size, evaluation etc. for collaborative research between universities, public and private sector HEC must prepare a robust grants monitoring system which should include the following: • Release of funds on successful achievement of milestones and assessment through peer review • Bi-annual and annual progress reports • Physical verification of milestones

Component/Sub-Component	Perceived Social Risk	Recommendations
Sub-component 1.2: Encouraging Entrepreneurship and Self-employment	Gender exclusion; Innovation Seed Fund and Business Incubation Centers may be inaccessible to female entrepreneurs	Ensure that some Business Incubation Centers (BICs) are established universities accessible to women Encourage women to apply for the Innovation Seed Fund
	Geographical exclusion; Innovation Seed Fund and Business Incubation Centers may be inaccessible to entrepreneurs from historically underserved areas	Ensure that some Business Incubation Centers (BICs) are located in universities in historically underserved areas such as Balochistan and South Punjab
	Discrimination; Innovation Seed Fund may discriminate against gender, religion or ethnicity	Selection criteria and applications must clearly state that equal opportunity will be given to all applicants regardless of gender, race, ethnicity and religion.
	Gender exclusion; grants may primarily go to male investigators	Encourage female investigators to apply for grants
	Geographical exclusion; grants may exclude universities in historically underserved areas	Ensure that universities in historically underserved areas (Balochistan, South Punjab etc.) are aware of the Local Challenges Fund and encouraged to apply
	Discrimination; grants may discriminate against gender, religion or ethnicity	Grants criteria and applications must clearly state that equal opportunity will be given to all applicants regardless of gender, race, ethnicity and religion.
Sub-component 1.3: Local Challenge Funds	Research conducted using grants Local Challenges Fund may be of poor quality and not contribute towards solving societal and economic problems.	Evaluation criteria must clearly list the sectors of national priority based on Pakistan Vision 2025 and HEC Vision 2025 to ensure relevance
	Research proposals maybe received for Kalash Valley and/or Kalash people	HEC must use their platform to collect and analyze data on past research trends to identify gaps in chosen themes and align evaluation criteria to ensure grants are provided for research ideas with higher chances of applicability
		Research proposals must include plans and budgets for commercialization and outreach

Component/Sub-Component	Perceived Social Risk	Recommendations
		Evaluation criteria should favour high impact relevant research publications over sheer quantity of research publications by applicants To limit individual research, HEC should provide incentives in terms of grant size, evaluation etc. for collaborative research between universities, public and private sector HEC must prepare a robust grants monitoring system which should include the following: • Release of funds on successful achievement of milestones and assessment through peer review • Bi-annual and annual progress reports • Physical verification of milestones HEC must ensure that all research proposals exploring, targeting or by any way relevant to Kalash Valley or Kalash people, will be handled in accordance to the IPPF of HEDP, and must be reported to WB before ANY TYPE of action is taken.
Component 2: Supporting Decentralized Higher Education Institutes for improved teaching and learning		
Sub-component 2.1: Strengthening the Affiliation System Sub-component 2.2: Bringing Education in Affiliated Colleges at par with International Standards	Gender exclusion; 500 colleges chosen may disproportionately benefit male or female colleges	Criteria for choosing colleges must be devised to ensure equitable representation of female and male colleges. Target at least 45% women's colleges to ensure gender inclusion.

Component/Sub-Component	Perceived Social Risk	Recommendations
Sub-component 2.3: Interacting with the local Socio-economic Environment. Including Monitoring and Evaluation within the AC Sector	Gender and geographical exclusion	Ensure student learning assessments and tracer studies assess project impacts on gender and geographical inclusion
Sub-component 2.4: Connecting Affiliated Colleges to Pakistan Education and Research Network (PERN)	Gender exclusion; 200 colleges chosen may disproportionately benefit male or female colleges	Criteria for choosing colleges must be devised to ensure equitable representation of female and male colleges.
	Geographical exclusion; 200 colleges chosen may disproportionately benefit provinces/areas with higher populations	Criteria for choosing colleges must be devised to ensure equitable representation of all provinces and inclusion of colleges located in historically underserved areas.
Component 3: Equipping Students and Higher Education Institutions with Modern Technology		
Subcomponent 3.1: Improving the policy environment for ICT use Subcomponent 3.2: Professionalizing PERN Subcomponent 3.3: Expanding PERN vertically	No perceived adverse social impacts	N/A
Component 4: Higher Education Management Information System and Data Driven Services		
Subcomponent 4.1: HEC Data Repository	Gender and geographical exclusion – HEC's data repository may not have adequate information to plan for social inclusion	Indicators and variables set for the data system must include gender, location and other social variables

Component/Sub-Component	Perceived Social Risk	Recommendations
Subcomponent 4.2: Digitization of University Administration	No perceived adverse social impacts	N/A
Component 5: Capacity Building, Project Management, Monitoring and Evaluation		
Component 5: Capacity Building, Project Management, Monitoring and Evaluation	No perceived adverse social impacts	N/A

7 Grievance Redress Mechanism

The Grievance Redress Mechanism will be adopted by the proponent to facilitate resolution of any community complaints and grievances about the project's environmental and social performance, in line with the requirements of World Bank.

7.1 Requirements of Grievance Redress Mechanism (GRM)

The HEC will respond to concerns and grievances of project affected parties related to the environmental and social performance of the project in a timely manner. For this purpose, the HEC will propose and implement a grievance redress mechanism (GRM) to receive and facilitate resolution of such concerns and grievances. The GRM will be proportionate to the potential risks and impacts of the project and will be accessible and inclusive. Where feasible and suitable for the project, the GRM will utilize existing formal GRM, supplemented as needed with project specific arrangements.

a. The GRM is expected to address concerns promptly and effectively, in a transparent manner that is culturally appropriate and readily accessible to all project-affected parties, at no cost and without retribution. The mechanism, process or procedure will not prevent access to judicial or administrative remedies. The HEC will inform the project-affected parties about the grievance process in the course of its community engagement activities, and will make publicly available a record documenting the responses to all grievances received; and
b. Handling of grievances will be done in a culturally appropriate manner and be discreet, objective, sensitive and responsive to the needs and concerns of the project-affected parties. The mechanism will also allow for anonymous complaints to be raised.

7.2 Grievance Redress Mechanism

The HEC shall establish a Grievance Redress Mechanism (GRM) to facilitate the resolution of complaints and grievances about the project's environmental and social performance. This shall be in line with the requirements of the World Bank. Under this mechanism, a Grievance Redress Cell (GRC) shall be established in the Project Implementation Unit. The focal person shall be directly accessible to the community and to the proponents of project(s) and subproject(s) from affiliated universities and colleges for the registration of complaints and their resolution.

The GRC shall maintain a Complaints Management Register (CMR), for logging complaints and grievances. All written and oral grievances will be recorded in the Register. The information will include the date and the particulars of the complainant; a description of the grievance; the follow-up action required; the person responsible for implementing the action; and a target date for its completion. Each complaint shall be recorded in the register with a complaint number and provided to the affected person for follow up purpose. GRC member shall take necessary actions as per the nature, scale and type of the grievance registered. GRC members can halt the project activities in case of causing non-resolvable grievances.

All the records of GRM shall be accessible to the public and World Bank. A monthly Grievance Redress Report (GRR) shall be prepared and be part of the compliance reports.

PCU will essentially make sure that the system of GRM is replicated in associated university as it is presented above. GRC at PCU will be responsible for coordinating with associated universities and accordingly report the GRM activities at the associated universities in the monthly GRR report.

8 BUDGET

The cost estimates to implement ESMF is provided in Table 24 below. This cost is included in the overall project cost. As mentioned above that HEC will establish PCU for the implementation of the project. In addition, as it is established in the institutional arrangement that HEC will strengthen its M&E Department by appointing Deputy Director-Environment. It recommended that one environmental specialist and one social specialist should be appointed under Deputy Director-Environment for assisting him to monitor the environmental and social aspects of the project. Additional costs could be included in the sub-project specific ESMPs. Annual cost of ESMF implementation is estimated about Rs. 13.5 million. The estimated total budget for 5 year HEDP project is 67.5 million PKR (482,143 USD; @ 1USD=140PKR)

Table 23: ESMF Implementation Budget

Description	Annual Cost (million PKR)	5yr Project Cost (million PKR)	(USD)	Basis
Environment Specialist-PCU	3.0	15.0	107,143	PKR 250,000/month salary
Social specialists-PCU	3.0	15.0	107,143	PKR 250,000/month salary
Third party validation	1.6	8.0	57,143	Four person months per year for a team of two experts i.e. environmental and social two person months each. Cost has been calculated on the basis of unit rate of PKR 400,000/month
ESMP Trainings	0.6	3.0	21,429	PCU will organize two trainings every years for affiliated project partners for strengthening ESMP preparation and implementation
Operational and Logistical Support	5.0	25.0	178,571	Lump sum
Miscellaneous and unforeseen	0.9	4.5	32,143	@ of 7% of the above costs
Total Annual Cost	14.1	70.5	580,715	

Bibliography

1 Planning Commission of Pakistan. Pakistan Vision 2025. www.pc.gov.pk
2 Higher Education Commission of Pakistan. HEC Vision 2025. www.hec.gov.pk
3 Government of Pakistan. 2018. Pakistan Education Statistics 2016-17. National Education Management Information Systems, Academy of Educational Planning and Management, Ministry of Federal Education and Professional Training. Islamabad
4 HEDP Project Document. 2018. HEC Proposal for Improving Tertiary Education in Pakistan. HEC, Islamabad.
5 Higher Education Commission of Pakistan. 2011. Environmental and Social Management Plan (ESMP) for Infrastructure Development Projects in Universities and HEIs in Pakistan. Islamabad: Pakistan
6 World Bank. 2017. System Appraisal for Better Education Results (SABER) Country Report, Pakistan.
7 Environmental and Social Framework, The World Bank, Washington, DC, 2017
8 Appendix 3, The World Bank's New Operational Manual, January 1999
9 Environmental Assessment Source Book 1999, Chapter 1, The World Bank Group
10 Topic 4 Screening, EA Training Resource Manual, Second Edition 2002
11 Table A1, Environmental and Social Safeguard Policies – Policy Objectives and Operational principles, The World Bank
12 OP 4.01 – Environmental Assessment, Operational Manual, The World Bank
13 Environmental Screening, Environmental Assessment Sourcebook Update, Environment Department, The World Bank, April 1993 Number 2
14 Climate Change Act, 2016
15 National Sanitation Policy, 2006
16 Balochistan Environmental Act 2012
17 KPK Environmental Protection Act 2014
18 The Sindh Environmental Protection Agency (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2014

Annexure 1: Environmental and Safety Checklist for Small Infrastructure and Renovation/Refurbishing Proposal

The purpose of this generalized checklist is to identify potential environmental and safety issues related to activities involving small infrastructure renovation/refurbishing work.

The checklist must be duly filled by the proponent which afterward reviewed and signed by the respective authority. If the checklist shows potential negative environmental impacts, the proponent will submit a separate mitigation measures table.

Title of Sub-project:

Applicant Institution:

Types of renovation/refurbishing work:

Estimated cost of renovation/refurbishing work:

Duration of renovation/refurbishing work:

Tentative Start Date:

Name and Designation of the Sub-project Coordinator/Focal Point:

Brief Description of Small infrastructure renovation/ refurbishing work (Within 200 words)

Checklist:

Sr. No.	Question	Answer		If [Yes], Possible Negative Environmental Impact
		Yes	No	
1	Will the renovation work disturb other academic activities?			
2	Will it create major noise?			
3	Will it create dust problem around the sites?			
4	Will it temporarily stop the water supply and sanitation system?			
5	Will any refrigeration/air conditioning units be removed/disposed?			
6	Will any liquid waste, or an item containing liquids (including oils), need to be transported off-site for reuse, recycle or disposal?			
7	Will equipment containing polychlorinated biphenyls (PCB's) be removed (i.e. transformers, capacitors, hydraulic and heat transfer systems, etc.)?			
8	Will building materials containing asbestos be removed/disposed?			
9	Will any building materials be removed/disposed that are coated with lead-based paint?			
10	Will any building materials be removed/disposed that contain lead, silver or chrome?			
11	Will batteries be removed/disposed (lead-acid or nickel-cadmium batteries from emergency lights and other battery-powered or battery-backup items?			
12	Will mercury-containing devices (switches, gauges, thermostats) be removed/disposed?			
13	Will an emergency generator set or other aboveground storage tank (AST) be installed or removed?			
14	Will the renovation work have any indirect impact on environment and ecosystem?			

Mitigation Measures Table

Implementation Plan				Monitoring Plan			
Project Phase	Environmental Impacts	Proposed Mitigation Measures	Responsibility	Monitoring Parameter(s)	Freq.	Responsibility	Compliance Criteria
Dsgn.							
Opr.							

Signature:

The above answers are true and complete. I understand that the HEC is replying on them to make its decision.

Sub-project Focal Point Signature & Date:

Contact Number and E-mail:

Please sign below to verify that the information in this document is accurate and complete to the best of your knowledge.

Environmental Professional Signature & Date (Optional):

Name:

Contact Number and E-mail:

Department/Institutional Head Signature & Date:

Name:

Contact Number and E-mail:

Annexure 2: Generic Safeguard Measures for Infrastructure Renovation and/or Refurbishing Construction Works

Anticipated Activity	Description
Suppression of dust emission	The control on dust emissions will be the responsibility of the contractor at the dust generation points, during construction activities. The contractor must measures to avoid dust spreading to the nearby areas. In addition, the contractor must ensure the provision of OH&S equipment and ensuring their use by the workers.
Safe disposal of domestic solid waste	Followings must be taken care: 1. All food waste shall be contained in covered bins and disposed of on a frequent basis to avoid attracting wildlife. 2. Trash bins shall be accessible at all locations where waste is generated. 3. The project area shall be kept clean and free of litter and no litter shall be allowed to disperse to the surrounding area. 4. Solid waste shall be removed from the site and transported to a municipal landfill or disposal site. 5. Waste shall not be dumped or buried in unauthorized areas or burned.
Safe disposal of hazardous and construction waste	The Hazardous Solid Waste Management shall identify proper management procedures for all hazardous materials and wastes that may be encountered during construction, including handling, labeling, transporting, and storing procedures. In addition, the plan shall address the following: 1. Non-toxic and biodegradable produces will be used whenever possible. 2. Hazardous materials shall be transported and stored in appropriate containers with clearly visible labels. Hazardous materials shall be stored under shed within secondary containment capable of containing its entire volume. 3. Equipment and work areas shall be regularly inspected for signs of leaks and spills. Spill containment and cleanup kits shall be available wherever hazardous materials are being used or stored. Any incidental spills or leaks shall be contained and cleaned up as soon as it is safe to do so. Any contaminated soil shall be collected and disposed of addressing the applicable regulatory requirements. 4. All workers shall receive training on proper handling and storage of hazardous materials, as well as spill response and cleanup procedures, prior to working on the project site. All such trainings will be the responsibility of contractor.
Soil pollution control	1. Storage of fuel, paint, and oil containers, oil filters, oily parts and oily rags on impervious floor under shed.

	2. Placement of fuel containers under containment and proper decantation arrangement to avoid its spillage and leakage on floor 3. Presence of spill kit to remove spills from the floor 4. Avoid washing the contaminated floors rather dry cleaning the spills from the floor with saw dust and rags
Noise abatement	1. Carry out regular inspection and maintenance of the construction equipment 2. In case of severe noise, use sound barriers to avoid the dispersion of sound waves 3. Workers should use noise protection safety equipment when working in a noisy area. 4. The noise level of 85 dBA for 8 hour working for the workers is considered safe. The contractors should ensure keeping noise levels within safe limits. In case of higher noise levels (more than 85 dBA), the workers should be rotated. The workers at higher noise level areas should not be allowed to work for more than two to three hours and shifted to calm places for rest of the hours
Protection of workers from health and safety hazards	1. The contractor is required to comply with all the precautions as required for the safety of the workmen as per the national/provincial and World Bank requirements. 2. Contractor has to ensure that all operators of dangerous machinery are properly trained/certified, and also insured. 3. The contractor shall supply all necessary safety appliances such as safety goggles, helmets, masks, safety shoes etc., to the workers and staff. 4. The contractor has to comply with all regulation regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. 5. Workers, who are engaged in welding works, would be provided with welder's protective eye-shields. 6. Suitable transport will be provided to take injured or ill person(s) to the nearest approachable hospital. 7. First Aid Box will be provided at every construction campsite and under the charge of a responsible person who shall always be readily available during working hours. 8. The contractor shall be responsible for providing safe drinking water and for supplying hygienic food for the team at the site.

Annexure 3: Checklist for Research Projects [including Laboratory Based Research]

The purpose of this checklist is to identify potential environmental and safety issues related to the research proposals (where laboratory testing could be involved or not).. This is a generalized checklist format for all category research activities. However, it is anticipated the research proposals under 'Arts, Humanities and Social Sciences' and Business and Management' will not have any environment impact and thus the proposals under these disciplines will not require to submit the checklist unless the review committee request for such checklist.

Please note that the project and sub-projects involving or resulting into following activities shall NOT be considered eligible for financing:

- Disturbance to the natural habitats
- Disturbance to ndigenous people
- Disturbance to physical and cultural resources
- Land acquisition
- Involving dam safety
- Involving International waterways
- Involving territories in dispute

The proponent will fill-up the format, which will be reviewed and signed by concerning authority. If the checklist shows potential negative environmental impacts, the proponent will submit a separate mitigation measures table.

Title of Research Work:

Applicant Name:

Supervisor Name and Designation:

Department:

Institution:

Level of Research Study [Please specify Masters/Doctoral/Others]:

Research Disciplines:

- □ Arts, Humanities and Social Sciences
- □ Business and Management
- □ Physical, Biological, and Earth Sciences
- □ Engineering and Technology
- □ Medical, Health, and Nutritional Sciences
- □ Agriculture, Livestock and Fisheries

Expected Duration of Research Work [Months]:

Tentative Start Date:

Brief Description of Research Activity [Within 200 words]:

Checklist:

Sr. No.	Question	Answer		Remarks
		Yes	No	
1	Will the research work be laboratory based? [*If the answer of question 1 is no, then go to question 6*]			
2	Does the laboratory have			
	i. Environment, health and safety protocol or guidelines?			
	ii. Adequate fire safety provision?			
	iii. Safety provision for gas cylinder handling?			
	iv. Proper waste disposal facilities?			
	v. Adequate liquid waste management facilities?			
	vi. Proper storage facilities for hazardous chemicals, pesticides etc.?			
	vii. Adequate ventilation system?			
	viii. First-aid facilities?			
	ix. Emergency exit facilities?			
	x. Trained professional to guide the Researchers /students about safety procedures?			
3	Will the laboratory based research work:			
	i. Require procurement of hazardous products (WHO Hazard Class I & II)?			
	ii. Produce hazardous waste materials?			
	iii. Generate infectious waste?			
	iv. Cause significant emissions of gas harmful to health?			
	v. Generate liquid waste?			
	vi. Cause any major noise?			
4	Does the applicant have received formal training on laboratory operation and safety rules?			
5	Does the applicant have previous work experience at laboratory on similar works?			
6	Will the research work require interventions at field level?			
7	Will the field based research work			
	i. Located at or near an environmentally sensitive area?			
	ii. Require procurement of hazardous products/pesticides (WHO Hazard Class I & II) or			

	will induce to the use of pesticide in the future?[74]			
	iii. Discharge any liquid waste in the environment?			
	iv. Discharge large quantities of waste/used water?			
	v. Generate hazardous waste?			
	vi. Impair downstream water quality?			
	vii. Have any possible degradation in land and ecosystem?			
	viii. Cause local air pollution from any plant/system operation?			
	ix. Generate excessive noise and/or dust?			
8	Will medical, biophysical or clinical research be conducted using human subjects?			
9	Will the project have any indirect impact on environment and ecosystem?			
10	Will the research work involve permission or clearance of any government department or agency?			
11	Will future expansion or implementation of research finding cause any major environment problem?			
12	Will outcomes from the research work have any impact on Indigenous People (Kalash community in Chitral)			
13	Will the project be related to dams or will promote activities that will rely on the performance of existing dams?			
14	Will the project involve International Waterway as per the WB policy?			
15	Will the project involve territories in dispute as per the WB policy>			

Items 13, 14 and 15 are include to re ensure that proponents exclude in their proposal these aspects which are not eligible for financing.

Mitigation Measures Table

Implementation Plan				Monitoring Plan			
Project Phase	Environmental Impacts	Proposed Mitigation Measures	Responsibility	Monitoring Parameter(s)	Freq.	Responsibility	Compliance Criteria

[74] Given that project will be investing in research of the agriculture sector, it is essential that clear and easy to follow guidelines are recommended to project proponents to promote the implementation and adoption of an integrated pest management approach and to stimulate the research on biological methods in line with the World Bank Policy on pest management. These type of research proposals will consider the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and

Dsgn.							
Opr.							

Signature:

The above answers are true and complete. I understand that the HEC is replying on them to make its decision.

Applicant Signature & Date:

_____

Contact Number and E-mail:

Please sign below to verify that the information in this document is accurate and complete to the best of your knowledge.

Supervisor Signature & Date:

Contact Number and E-mail:

Department Head Signature & Date:

Name:

Contact Number and E-mail:

Annexure 4: Pakistan Environmental Protection Agency (IEE and EIA) Regulations

This describes the Pakistan Environmental Protection Agency (IEE and EIA) Regulations. Since the 18th amendment in the Constitution of Pakistan, the subject of 'environment protection' has been given to the Provinces. Each of the four provinces has developed their regulations to assess the development projects which may have environmental impacts.

- ❑ The Punjab EPA [2012] have stated schedules I and II categorizing the proposed projects requiring Initial Environmental Examination [IEE] and/or Environmental Impact Assessment [EIA].

- ❑ The Sindh EPA [2014] have stated schedules I, II and III categorizing the proposed projects requiring Checklist, Initial Environmental Examination [IEE] and/or Environmental Impact Assessment [EIA].

- ❑ The Khyber Pakhtunkhwa EPA 2014, has stated Strategic Environmental Assessment [Section 12] and Initial Environmental Examination [IEE] and Environmental Impact Assessment [EIA] [Section 13] to list the requirements of proposed project.

- ❑ The Balochistan EPA 2012, has stated Strategic Environmental Assessment [Section 13] and Initial Environmental Examination [IEE] and Environmental Impact Assessment [EIA] [Section 15] to list the requirements of proposed project.

Punjab Environmental Protection Act Regulations 2000, Schedule I & II[75]

SCHEDULE I [IEE]	SCHEDULE II [EIA]
A. Agriculture, Livestock and Fisheries 1. Poultry, livestock, stud and fish farms with total cost more than Rs.10million 2. Projects involving repacking, formulation or warehousing of agricultural products	**A. Energy** 1. Hydroelectric power generation over 50 MW 2. Thermal power generation over 200 MW 3. Transmission lines (11 KV and above) and grid stations 4. Nuclear power plans 5. Petroleum refineries
B. Energy 1. Hydroelectric power generation less than 50 MW 2. Thermal power generation less than 200 KW 3. Transmission lines less than 11 KV, and large distribution projects 4. Oil and gas transmission systems	**B. Manufacturing and processing** 1. Cement plants 2. Chemicals projects 3. Fertilizer plants 4. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost of Rs.100 million and above

[75] Source: Punjab EPA Review of IEE & EIA Regulations, 2000

5. Oil and gas extraction projects including exploration, production, gathering systems, separation and storage 6. Waste-to-energy generation projects	5. Industrial estates (including export processing zones) 6. Man-made fibers and resin projects with total cost of Rs.100 M and above 7. Pesticides (manufacture or formulation) 8. Petrochemicals complex 9. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except apparel),printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs.10 million 10. Tanning and leather finishing projects
C. Manufacturing and processing 1. Ceramics and glass units with total cost more than Rs.50 million 2. Food processing industries including sugar mills, beverages, milk and dairy products, with total cost less than Rs.100 million 3. Man-made fibers and resin projects with total cost less than Rs.100 million 4. Manufacturing of apparel, including dyeing and printing, with total cost more than Rs.25 million 5. Wood products with total cost more than Rs.25 million	**C. Mining and mineral processing** 1. Mining and processing of coal, gold, copper, sulphur and precious stones 2. Mining and processing of major non-ferrous metals, iron and steel rolling 3. Smelting plants with total cost of Rs.50 million and above
D. Mining and mineral processing 1. Commercial extraction of sand, gravel, limestone, clay, sulphur and other minerals not included in Schedule II with total cost less than Rs.100 million 2. Crushing, grinding and separation processes 3. Smelting plants with total cost less than Rs.50 million	**D. Transport** 1. Airports 2. Federal or Provincial highways or major roads (except maintenance, rebuilding or reconstruction of existing roads) with total cost of Rs.50 million and above 3. Ports and harbor development for ships of 500 gross tons and above 4. Railway works
E. Transport 1. Federal or Provincial highways (except maintenance, rebuilding or reconstruction of existing metalled roads) with total cost less than Rs.50 million 2. Ports and harbor development for ships less than 500 gross tons	**E. Water management, dams, irrigation and flood protection** 1. Dams and reservoirs with storage volume of 50 million cubic meters and above or surface area of 8 square kilometers and above 2. Irrigation and drainage projects serving 15,000 hectares and above
F. Water management, dams, irrigation and flood protection 1. Dams and reservoirs with storage volume less than 50 million cubic meters of surface area less than 8 square kilometers 2. Irrigation and drainage projects serving less than 15,000 hectares	**F. Water supply and treatment** 1. Water supply schemes and treatment plants with total cost of Rs.25 million and above

3. Small-scale irrigation systems with total cost less than Rs.50 million	
G. Water supply and treatment 1. Water supply schemes and treatment plants with total cost less than Rs.25 million	**G. Waste Disposal** 1. Waste disposal and/or storage of hazardous or toxic wastes (including landfill sites, incineration of hospital toxic waste) 2. Waste disposal facilities for domestic or industrial wastes, with annual capacity more than 10,000 cubic meters
H. Waste disposal 1. Waste disposal facility for domestic or industrial wastes, with annual capacity less than 10,000 cubic meters	**H. Urban development and tourism** 1. Land use studies and urban plans (large cities) 2. Large-scale tourism development projects with total cost more than Rs.50 million
I. Urban development and tourism 1. Housing schemes 2. Public facilities with significant off-site impacts (e.g. hospital wastes) 3. Urban development projects	**I. Environmentally Sensitive Areas** 1. All projects situated in environmentally sensitive areas
J. Other projects Any other project for which filing of an IEE is required by the Federal Agency under sub-regulation (2) of Regulation 5	**J. Other projects** 1. Any other project for which filing of an EIA is required by the Federal Agency under sub-regulation (2) of Regulation 5. 2. Any other project likely to cause an adverse environmental effect

Sindh Environmental Protection Act Regulations 2000, Schedule I, II & III[76]

SCHEDULE I [IEE]	SCHEDULE II [EIA]	SCHEDULE III [CHECKLIST]
A. Agriculture, Livestock and Fisheries 1. Poultry, livestock, stud and fish farms 2. 2. Projects involving packaging, formulation, cold storage and warehouse of agricultural products.	**A. Energy** 1. Hydroelectric power generation over 50 MW 2. Thermal power generation over 100 MW 3. Coal power projects above 50 MW 4. Transmission lines (11 KV and above) and distribution projects. 5. Nuclear power plants 6. 6. Wind energy projects if falls under any sensitive, protected area.	a) Construction of, offices and small commercial buildings (1-6 story),home industrial units, ware houses, marriage / banquet facilities, large scale motor vehicles workshops, restaurants / food outlets ,large baking unit subject to the compliance with existing zoning laws. b) b. Reconstruction / rehabilitation of roads (small roads in urban area and farm to market roads more than 2 km).
B. Energy	**B. Oil and Gas Projects** 1. Petroleum refineries.	c) On-farm dams and fish farms. d) Pulses mills.

[76] Source: SEPA Review of IEE & EIA Regulations, 2014

1. Hydroelectric power generation less than 50 MW 2. Thermal power generation less than 100MW 3. Coal fired power plants with capacity less than 50 MW 4. Transmission lines less than 11 KV, and grid station 5. Waste-to-energy generation projects including bio-mass less than 25 MW 6. Solar project 7. Wind project	2. LPG and LNG Projects(including LNG Terminals, re-gasification units) except LPG filling stations 3. Oil and gas transmission systems 4. Oil and gas gathering system, separation and storage.	e) Flour Mills f) Projects promoting energy efficiency (small scale). g) Lining of existing minor canals and /or water courses. h) Canal cleaning i) Forest harvesting operations j) Rain harvesting projects k) Rural schools (Secondary and Higher Secondary) and rural and basic health units having at least ten beds capacity.
C. Oil and Gas Projects 1. Oil and gas 2D/3D Seismic survey and drilling activities 2. Oil and gas extraction projects including exploration and production located outside the environmentally sensitive areas 3. Construction of LPG storage facilities 4. Construction of LPG,CNG filling station and petrol pumps	**C. Manufacturing and Processing** 1. Cement plants 2. Chemical manufacturing industries 3. Fertilizer plants 4. Steel Mills 5. Sugar Mills and Distilleries 6. Food processing industries including beverages, dairy milk and products, slaughter houses and related activities with total cost more than Rs. 200 Million 7. Industrial estates (including export processing zones) 8. Man-made fibers and resin projects with total cost of Rs 200 M and above 9. Pesticides (manufacture or formulation) 10. Petrochemicals complex 11. Synthetic resins, plastics and man-made fibers, paper and paperboard, paper pulping, plastic products, textiles (except	l) BTS Towers m) Lime Kilns n) Ice factories and cold storage. o) Cotton oil mill p) Warehouses for pesticides and pharmaceuticals

	apparel),printing and publishing, paints and dyes, oils and fats and vegetable ghee projects, with total cost more than Rs. 10 million 12. Tanning and leather finishing projects 13. Battery manufacturing plant	
D. Manufacturing and Processing 1. Ceramics and glass units less than 500 million 2. Food processing industries with total cost less than Rs. 200 millions	**D. Mining and Mineral Processing** 1. Mining and processing of coal, gold, copper, sulfur and precious stones 2. Mining and processing of major non-ferrous metals, iron and steel rolling 3. Smelting plants (total cost of Rs. 100 M and above)	
	E. Transport 1. Airports 2. Federal or Provincial highways or major roads (including rehabilitation or rebuilding or reconstruction of existing roads) 3. Ports and harbor development 4. Railway works 5. Flyovers, underpasses and bridges having total length of more than 500 m	
	F. Water Management, Dams, Irrigation and Flood Protection 1. Dams and reservoirs with storage volume of 25 million cubic meters and above having surface area of 4 square kilometers and above 2. Irrigation and drainage projects serving 15,000 hectares and above 3. Flood Protection	

	G. Water Supply and Filtration 1. Large Water supply schemes and filtration plants.	

The Khyber Pakhtunkhwa Environmental Protection Act, 2014[77]

12. <u>Strategic environmental assessment</u>:

1. Government may ask to carry out strategic environmental assessment, of all or any of the plan or policy given below:
   i. Socio-economic development, industrial and agricultural development, urban and rural development;
   ii. Land use and water use management;
   iii. The exploitation of natural resources;
   iv. Economic zones or industrial parks and estates;
   v. Transport and infrastructure;
   vi. Solid, municipal and industrial waste;
   vii. Tourism;
   viii. Any other plan or policy likely to have an adverse impact on environment;
   ix. Prevention of water pollution through improper sanitation and control flow of sanitation water into the rivers; and
   x. Separate zones shall be specified for poultry and cattle farming and slaughtering houses.

2. All Government Agencies, Local Councils and Local Authorities and Departments may be asked to conduct and formulate the strategic environmental assessment statement and shall submit it to the Agency which may contain--
   i. Objectives, scale and environmental characteristics;
   ii. Description of the natural, socio-economic and environmental conditions; and
   iii. Assessment of possible environmental impact likely to be caused during implementation.

3. The Agency shall, within 120 days of the filing of a strategic environmental assessment screening statement, complete in all respects---
   i. Circulate the strategic environmental assessment report and conduct a public hearing of the strategic environmental assessment report;
   ii. Review any comments received from the circulation and public hearing carried out under clause (i); and
   iii. Advise the Government Agency, Local Council or Local Authority concerned to include such measures and take such steps, as it deems necessary, to modify the policy or development plan according to environmental objectives and thereafter the policy or development plan shall stand so modified.

4. The provisions of sub-sections (1), (2) and (3) shall apply to such categories of plans and policies and in such manner as may be prescribed.

5. The Agency shall maintain separate registers for strategic environmental assessment reports, which shall contain brief particulars of each policy and development plan and a summary of decisions taken thereon and which shall be open to inspection for the public at

[77] The Khyber Pakhtunkhwa Environmental Protection Act, 2014

all reasonable hours and the disclosure of information in such registers shall be subject to the provisions of this Act.

13. <u>Initial environmental examination and environmental impact assessment.</u>

1. No proponent of a project shall commence construction and operation unless he has filed with the Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Agency, environmental approval in respect thereof.

2. The Agency shall

   a) Review the initial environmental examination and accord its approval or require submission of an environmental impact assessment by the proponent; or
   b) Review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the environmental impact assessment be re-submitted after such modifications as may be stipulated, or reject the project as being contrary to environmental objectives.

3. Every review of an environmental impact assessment shall be carried out with public participation and no information will be disclosed during the course of such public participation which relates to
   a) Trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director-General of the Agency is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or
   b) International relations, national security or maintenance of law and order, except with the consent of Government; or
   c) Matters covered by legal professional privilege.

4. The Agency shall communicate its approval or otherwise within a period of four months from the date of the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules, provided that delay is not on part of the proponent for the provision of additional information asked for during the review process or conductance of public hearing of the project.

5. Subject to sub-section (4), Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.

6. The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.

7. The projects or any activity of a proponent not covered under sub-section (6), specified in guidelines shall obtain a general environmental approval in a manner prescribed in guidelines in respect thereof.

8. The Agency shall maintain separate Registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such Registers shall be subject to the restrictions specified in sub-section (3).

The Balochistan Environmental Protection Act, 2012[78]

Strategic Environment Assessment (SEA) 13:

1) This section regulates the conditions, methods and procedure according to which the assessment of impact of certain plans and programmes on the environment (hereinafter referred to as: strategic assessment) shall be carried out in order to provide for the environmental protection and improvement of sustainable development through integration of basic principles of environmental protection into the procedure of preparation and adoption of plans and programmes.
2) The Government at all levels of administration and in every sector shall incorporate environmental considerations into policies, plans, programmes and strategies.

Initial Environmental Examination and Environmental Impact Assessment 15:

1) No proponent of a project of public and private sector shall commence construction or operation unless he has filed an Initial Environmental Examination with the Government Agency designated by Balochistan Environmental Protection Agency, as the case may be, or, where the project is likely to cause an adverse environmental effects an environmental impact assessment, and has obtained from the Government Agency approval in respect thereof.
2) The Government Agency shall subject to standards fixed by the Balochistan Environmental Protection Agency:
    a. Review the initial environmental examination and accord its approval, or require submission of an environmental impact assessment by the proponent; or review the environmental impact assessment and accord its approval subject to such conditions as it may deem fit to impose, require that the environmental
    b. Impact assessment be re-submitted after such modifications as may be stipulated or reject the project as being contrary to environmental objectives.
3) Every review of an environmental impact assessment shall be carried out
    a. with public participation and no information will be disclosed during the course
    of such public participation which relates to:
        i. Trade, manufacturing or business activities, processes or techniques of a proprietary nature, or financial, commercial, scientific or technical matters which the proponent has requested should remain confidential, unless for reasons to be recorded in writing, the Director General of the Balochistan Environmental Protection Agency is of the opinion that the request for confidentiality is not well-founded or the public interest in the disclosure outweighs the possible prejudice to the competitive position of the project or its proponent; or
        ii. International relations, national security or maintenance of law and order, except with the consent of the Government of Balochistan; or
        iii. Matters covered by legal professional privilege.
4) The Government Agency shall communicate its approval or otherwise within a period of four months from the date the initial environmental examination or environmental impact assessment is filed complete in all respects in accordance

[78] The Balochistan Environmental Protection Act, 2012

with the prescribed procedure, failing which the initial environmental examination or, as the case may be, the environmental impact assessment shall be deemed to have been approved, to the extent to which it does not contravene the provisions of this Act and the rules and regulations.

5) Subject to sub-section (4) the appropriate Government may in a particular case extend the aforementioned period of four months if the nature of the project so warrants.
6) The provisions of sub-sections (1), (2), (3), (4) and (5) shall apply to such categories of projects and in such manner as may be prescribed.
7) The Government Agency shall maintain separate registers for initial environmental examination and environmental impact assessment projects, which shall contain brief particulars of each project and a summary of decisions taken thereon, and which shall be open to inspection by the public at all reasonable hours and the disclosure of information in such registers shall be subject to the restrictions specified in sub-section (3).
8) No concession areas for any developmental activities shall be awarded to any International/National groups or firms without consultation and concurrence of the Government of Balochistan/Environmental Protection Agency.
9) The prospect licenses for mining, quarrying, crushing etc. shall only be awarded/ granted in compliance with the sub section (1), (2), (3), (4) and (5)
10) The cellular companies shall obtain environmental approval from the Balochistan EPA before installing Base Transceivers Station (BTS).
11) BTS Stations should be required to undergo routine evaluation for Compliance. Whenever an application is submitted to the Balochistan EPA for construction or modification of a transmitting facility. EPA shall have the authority to take action if a cellular base station antenna does not comply with the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines and recommendations of the report titled `Environmental and Health Related Effects of the Cellular Base Station Antennas' carried out by IT and Telecom Division, Ministry of Information Technology.
12) No person or company related to public and private sector shall commence construction or operation unless the concerned building authority accord approval under the provisions of the in vogue Building Code.
13) After fulfilling the sub section (12) an action plan shall be submitted to the concerned municipal/town/union council to carry out the activities for a specific time period as to provide the general public or road users an alternative corridor.
14) The waste generated during the construction or maintenance or repair of any building shall be appropriately disposed of or transported or collected to a designated place allocated for the purpose like any land fill site to avoid public nuisance.
15) The construction or repair activities especially in the main city area shall be carried out in a manner to minimize the road congestion or blockage.
16) The proponent of the project shall remit fifty thousand rupees as review fee of an Initial Environmental Examination (IEE) and one hundred thousand as review fee for Environmental Impact Assessment (EIA).
17) The person or company in public or private sector intend to commence any scheme or project do not falling under schedule I and II of this Act shall remit twenty five thousand rupees as an Environmental approval fee to the Balochistan Environmental Protection Agency.

Annexure 5: List of Banned Pesticides

Pesticides Banned in Pakistan

The following pesticides are de-registered and their import is banned in Pakistan[79].

1. Binapacryl
2. Bromophos ethyl
3. Captafol
4. Chordimeform
5. Chlorobenzilate
6. Chlorthiophos
7. Cyhexatin
8. Dalapon
9. DDT
10. Dibromochloropropane + Dibromochloropropene
11. Dicrotophos
12. Dieldrin
13. Disulfoton
14. Endrin
15. Ethyene dichloride + Carbontetrachloride (EDCT)
16. Leptophos
17. Mercury Compound
18. Mevinphos
19. Propergite
20. Toxaphene
21. Zineb

Internationally Banned Pesticides:

Following is the list of internationally banned pesticides[80].

1 Acephate
2 Acrolein
3 Alachlor
4 Aldicarb
5 Alpha-BHC; Alpha-HCH
6 Alpha-chlorohydrin
7 Amitraz
8 Anthracene oil
9 Arsen and its compounds (see annex 1)
10 Atrazine
11 Azafenidin
12 Azinphos-ethyl
13 Azinphos-methyl

[79] 1994 Pesticides and Environment Situation in Pakistan; by Abdul Jabbar and Seeme Mallick; Working Paper Series # 19
[80] 2015 LIST OF BANNED PESTICIDES AND PESTICIDES WATCHLIST Version 1.0; www.utz.org/resource-library.org

14 Benomyl
15 Beta-cyfluthrin; Cyfluthrin
16 Beta-HCH; Beta-BCH
17 Blasticidin-S
18 Borax; disodium tetraborate decahydrate (only if used as pesticide)
19 Boric acid (only if used as pesticide)
20 Brodifacoum
21 Bromadiolone
22 Bromethalin
23 Bromoxynil butyrate
24 Butoxycarboxim
25 Cadusafos
26 Captafol
27 Carbaryl
28 Carbofuran
29 Carbosulfan
30 Chlordane
31 Chlorethoxyphos
32 Chlorfenapyr
33 Chlorfenvinphos
34 Chlormephos
35 Chlorophacinone
36 Chlorotoluron
37 Chlozolinate
38 Coumaphos
39 Coumatetralyl
40 Creosote
41 Cyhalothrin
42 Daminozide
43 DDT
44 Demeton-S-methyl
45 Dichlorvos; DDVP
46 Dicofol
47 Dicrotophos
48 Difenacoum
49 Difethialone
50 Dimethenamid
51 Dimoxystrobin
52 Dinocap
53 Dinoterb
54 Diphacinone
55 Disulfoton
56 DNOC and its salts
57 Edifenphos
58 Endosulfan
59 E-Phosphamidon
60 Epichlorohydrin
61 EPN
62 Ethiofencarb
63 Ethoprophos; Ethoprop

64 Ethylene oxide
65 Ethylene thiourea
66 Famphur
67 Fenamiphos
68 Fenchlorazole-ethyl
69 Fenthion
70 Fentin acetate; Triphenyltin acetate
71 Fentin hydroxide; Triphenyltin hydroxide
72 Fenvalerate
73 Ferbam
74 Flocoumafen
75 Fluazifop-butyl
76 Flucythrinate
77 Flumioxazin
78 Fluoroacetamide
79 Flusilazole
80 Formaldehyde
81 Formetanate
82 Furathiocarb
83 Haloxyfop-R
84 Heptenophos
85 Hexachlorobenzene
86 Hexchlorocyclohexane; BHC mixed isomers
87 Isoxathion
88 Lindane
89 Linuron
90 Maleic hydrazide
91 Mecarbam
92 Mercury and its compounds
93 Methamidophos
94 Methidathion
95 Methiocarb
96 Methomyl
97 Methyl bromide
98 Mevinphos
99 Molinate
100 Monocrotophos
101 Monolinuron
102 Nicotine
103 Nitrobenzene
104 Nonylphenol ethoxylates
105 Omethoate
106 Oxamyl
107 Oxydemeton-methyl
108 Paraffin oils; mineral oils
109 Paraquat dichloride
110 Parathion
111 Parathion-methyl
112 PCP; Pentachlorphenol
113 Pentachlorobenzene

114 Permethrin
115 Phorate
116 Phosalone
117 Phosphamidon
118 Profoxydim
119 Propetamphos
120 Propham
121 Propylene oxide, Oxirane
122 Pyrazophos
123 Pyriminil
124 Quintozene
125 Silafluofen
126 Simazine
127 Sodium fluoroacetate (1080)
128 Strychnine
129 Sulfotep
130 Tebupirimifos
131 Technazene
132 Tefluthrin
133 Tepraloxydim
134 Terbufos
135 Thiodicarb
136 Thiofanox
137 Thiometon
138 Thiourea
139 Thiram in formulations with benomyl and carbofuran
140 Triazamate
141 Triazophos
142 Tributyltin compounds; triorganostannic compounds
143 Trichlorfon
144 Tridemorph
145 Vamidothion
146 Vinclozolin
147 Warfarin
148 Zeta-Cypermethrin
149 Zinc phosphide
150 Zineb
151 Z-Phosphamidon

Annexure 6 – Guidelines for the development of E-Waste Management Plan

The project couldl procure IT equipments for the countrywide locatios to modernize the connectivity and communication systems. Hence, it is assessed there will be a potential risk associated with the improper disposal of the old and obsolete IT equipments. HEC will implement management measures to ensure the management of hazardous waste that would be generated under the project scope.

If necessary, HEC will undertake the following task to prepare the E-Waste Management Plan for the project;

a) Conduct the detail scoping exercise under to determine the type, quantity of the IT equipments and risks associated with the E- Waste generated by the these equipments.
b) Assess and analyze the type of hazardous waste and its risk to the human health, physical and biological environment and ecosystem services.
c) Apply the mitigation hierarchy to the management of e waste during all the phases of the project. Propose appropriate measures to minimize and reduce the risks of waste generated propose safe disposal of the e- waste.
d) Review the national laws, regulations, policies, international agreements, conventions, and treaties which implies the E waste management rules and guiding principles for environmental sound safe disposal.
e) Develop the E-Waste Management Plan for the IT waste generated under the project according to the Good International Industrial Practices (GIIP) of disposal and WB ESHSG.
f) The E-Waste Management Plan will be developed by taking in account the technical input and close consultation with the national Focal Point of Basel Convention based at the Ministry of Climate Change.
g) The E-Waste Management plan include the following criteria for third party or vendor information about and/or provided by and pertinent to the third party may need to include:
    - Information in public records, for example, corporate registers;
    - Current business licenses, registrations, permits, certificates, and approvals;
    - Documents relating to their track record pertaining to hazardous waste management systems;
    - Safety records; and
    - Copies of relevant previous contracts.

Annexure 7 – List of Participants from Stakeholder Consultations – Universities

The Consultations were facilitated by the following team members from HEC

Sr. No.	Name	Designation	Email	Contact No.	Relevant Component
1	Mr. Fida Hussain	DG (Learning Innovation)	fhussain@hec.gov.pk	051-90402100	Component 2
2	Mr. Abdullah Fayyaz Chattha	Director (IT)	achattha@hec.gov.pk	051-90402212	Component 2.4, Component 3
3	Ms. Noshaba Awais	Director (R&D)	nawais@hec.gov.pk	051-90401905	Component 1
4	Mr. Fawad Raza	Dy. Director (IT)	fawadraza@hec.gov.pk	051-90402265	Component 2.4, Component 3
5	Mr. Rizwan Rashid	Consultant (IT)	rrashid@hec.gov.pk	051-90402266	Component 4
6	Ms. Khushbakht Ejaz	Assistant Director (A&C)	kejaz@hec.gov.pk	051-90401609	Coordination and Administrative support

Details of participants from Universities are provided in the tables below

FEDERAL						
Name of University	**INTERNATIONAL ISLAMIC UNIVERSITY ISLAMABAD**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**

1	Faculty Member/Researcher	Male	Dr. Tariq Javed	Associate Professor	Math & Stat	3005283773
2	Faculty Member/Researcher	Female	Dr. Nyla Jabeen	Assistant Professor	Biological Science	3315446902
3	Registrar	male	Syed Naveed Ehtesham	Addl Dir (Acad)	Academics	3003065603
4	Treasurer	male	Mr. Ayaz Ali	Addl Dir (Finanace)	Financae	3005262680
5	MS/PHD student	Male	Basharat Husain	Ph.D Scholar	Psychology	3465353662
6	MS/PHD student	Female	Sadaf Anwar	scholar	Bilogical Science	3315142330
7	Faculty Member/Researcher	Male	Dr. Muhammad Riaz	Professor	Medicinal Chemistry	mriaz1786@yahoo.com
8	Faculty Member/Researcher	Male	Dr. Ikram Ullah	Assistant Professor	Biological Science	ikram.ullah@iiu.edu.pk
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Inam ul Haq	Director	(Exams)	3335265351
9	Director ORIC/QEC	male	M. Adnan Khan	Director (HR)	(HR)	3335000250

Name of University	**Quaid e Azam University, Islamabad**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Tariq Majeed	Assistant Professor	Economics	
2	Faculty Member/Researcher	Female	Miss. Robina Rashid	Lecturer	Info. Tech.	
3	Registrar	Male	Dr. Shafiq-ur-Rehman	Registrar	Registrar office	
4	Treasurer	Male	Mr. Fayyaz Muhammad	Acting Treasurer	Treasurer Office	

5	MS/PHD student	Male	Zahir Ahmed	Ph.D. (1st semester)	History	
6	MS/PHD student	Female	Tazeem Imran	Ph.D. (5th semester)	History	
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Dr. Shafiq-ur-Rehman	Registrar	Registrar office	
8	Director ORIC	Male	Mr. Muhammad Khawar Rauf	Director, ORIC	ORIC	

Name of University	**COMSATS University Islamabad**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Majid Iqbal Khan	Associate Professor	Computer Science	0300-5278858
2	Faculty Member/Researcher	Male	Dr. Muhammad Junaid Mughal	Professor	Electrical Engineering	0300-9855622
3	Registrar	Male	Dr. Fahim A. Qureshi	Registrar	Registrar Office	0321-8415890
4	Senior Manager (IT)	Male	Aumair Qayyum	Senior Manager (IT)	IT Center	0321-5324442
5	Treasurer	Male	Muhammad Azam	Treasurer	Treasurer Office	0345-5241556
Workshop Day 2: April 11, 2019						
1	Registrar	Male	Dr. Fahim A. Qureshi	Registrar	Registrar Office	0321-8415890

2	Senior Manager (IT)	Male	Aumair Qayyum	Senior Manager (IT)	IT Center	0321-5324442
3	Director ORIC	Male	Muhammad Raza Khan	General Manager	ORIC	0300-9745574

BALOCHISTAN						
Name of University	**Balochistan University of Information Technology, Engineering and Management Sciences (BUITEMS) Quetta**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Noor Muhammad	Assistant Professor	Management Sciences	O3138039294
2	Faculty Member/Researcher	Female	Dr. Rozeena Shaikh	Associate Professor	Life Sciences	O3333599686
3	Registrar	Male	Jamal Mustafa	Registrar	Administration	O3003855003
4	Treasurer	Male	Babar Faiz	Director Finance	Finance	O3337837902
5	MS/PHD student	Male	Mr. Abdul Qahir	MS Scholar	Management Sciences	O3168184866
6	MS/PHD student	Male	Mr. M. Imran	MS Scholar	Management Sciences	O3438174527
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Jamal Mustafa	Registrar	Administration	O3003855003

8	Director ORIC	Male	Dr. M. Naeem Shahwani	Director ORIC	ORIC	O3138744737

Name of University	**University of Balochistan, Quetta**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Designation**	**Name**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dean Research	Dr. Malik Tariq	Philosophy	3337810963
2	Faculty Member/Researcher	Female	Dean Management Sciences	Dr. Sobia Ramzan	Department of Management Sciences	3458341307
3	Registrar	Male	Registrar	Mr. Muhammad Tariq Jogazai	Registrar	3337844448
4	Treasurer	Male	Treasurer	Mr. Jiand Khan Jamaldini	Accounts & Finance	3337806227
5	MS/PHD student	Male	student	Mr. Zahoor Ahmed	Sociology	3318310605
6	MS/PHD student	Female	student	Ms Shazia Jaffar	Pakistan Studies Centre	3108001793
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Registrar	Mr. Mohammad Tariq Jogazai	Registrar	3337844448
8	Director ORIC/QEC	Male	Director ORIC	Dr. Waheed Noor	IT &Computer Sciences Deptt.	3337837101

Name of University	Lasbela University of Agriculture, Water and Marine Sciences, Uthal, District Lasbela					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Ali Hassan	Lecturer	Business Management	3218715316
2	Faculty Member/Researcher	Female	Reehana Hassan	Lecturer	Environmental Sciences	3158133378
3	Registrar	Male	Dr. Ahmed Nawaz	Registrar	Registrar	3468377356
4	Treasurer	Male	Mr. Kamran Saeed	Add Treasurer	Finance	3443031595
5	MS/PHD student	Male	Jaffar Iqbal	MS student	WRM	3248946246
6	MS/PHD student	Female	Farah	MS student	Linguistic	3471272781
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Dr. Ahmed Nawaz	Registrar	Registrar	3468377356
8	Director ORIC	Male	Dr. Mir Dost	Director	ORIC	3168898425

KPK						
Name of University	**The University of Haripur**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Ali Raza Gurmani	Associate Professor	Soil & Environmental Sciences	0331-5251544
2	Faculty Member/Researcher	Female	Dr. Tehsin Tahir	Assistant Professor	Education	031-8115266

3	Registrar	Male	Dr. Shiraz Khan	Registrar	Registrar Office	0315-5081553
4	Treasurer	Male	Dr. Muhammad Tariq Khan	Treasurer	Treasurer Office	0300-5205136
5	MS/PHD student	Male	Muhammad Affan Khan	PhD Scholar	Horticulture	0345-9683358
6	MS/PHD student	Female	Muhammad Kamran	PhD Scholar	Islamic & Religious Studies	
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Dr. Shiraz Khan	Registrar	Registrar Office	0315-5081553
8	Director ORIC	Male	Dr. Muhammad Jehangir	Director	ORIC	0300-5233057

Name of University	**Women University, Sawabi**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Female	Dr. Surraya Khanum	Assistant Professor	Zoology	0334-8742560
2	Faculty Member/Researcher	Female	Dr. Afsan Qayyum	Assistant Professor	Mathematics	0345-5237479
3	Registrar	Male	Muhammad Bilal	Assistant Registrar		0333-9412625
4	Treasurer	Male	Muhammad Hussain	Aditional Tresurer		0333-9166258
5	M.Sc Student	Female	Kainat Bibi	M.Sc Student	Botany	0335-5099856
6	BS(VIII)student	Female	Seema Gul	BS(VIII)student	Zoology	0301-8580029
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Muhammad Bilal	Assistant Registrar		0333-9412625

8	Director ORIC	Male	Prof. Dr. Ihsanullah	Director ORIC		0301-8580029

Name of University	Shaheed Benazir Bhutto Women University, Peshawar					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Female	Ms Mamoona Alam	lecturer	chemistry	3459150245
2	Faculty Member/Researcher	Female	Dr Rehna masood	Assistant Professor	Biochemistry	3331345454
	Faculty Member/Researcher	Female	Habiba	Lecturer	Microbiology	3319922258
3	Registrar	Female	Ms Zohra Shahzad	Registrar	Registrar's Office	3339545350
4	Treasurer	Female	Ms Sana Younas	Treasurer	Treasurery	3009024467
5	MS/PHD student	Female	Ms. Ruqia	Research student	Chemistry	
6	MS/PHD student	Female	Ms. Rafia	Research student	Chemistry	
7	MS/PHD student	Female	Ms. Laiqa Mehreen	Research student	Biochemistry	
8	MS/PHD student	Female	Ms. Shehzadi	Research student	Biochemistry	
9	MS/PHD student	Female	Ms. Kulsoom	Research student	Microbiology	
10	MS/PHD student	Female	Ms. Tabinda	Research student	Microbiology	
Workshop Day 2: April 11, 2019						
3	Registrar	Female	Ms Zohra Shahzad	Registrar	Registrar's Office	3339545350

8	Director ORIC	Female	Sana Jamil	Research Assistant	Oric	3475876699
8	Director QEC	Female	Mahwash Asmatullah	Deputy Director	QEC	3329215857

Name of University	**University of Engineering and Technology, Peshawar**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Nasir Ahmad	Asst. Professor	Computer System Engg	0334-9234797
2	Faculty Member/Researcher	Female	Engr. Durr-e-Nayab	Lab Engineer	Computer System Engg	0334-9220255
3	Registrar	Male	Dr. Khizar Azam	Registrar	Establishment	091-9222215
4	Treasurer	Male	Mr. Nek Muhammad Khan	Treasurer	Finance	091-9222216
5	MS/PHD student	Male	Engr. Arsalan Khan	Researcher	Mechanical Engg	0345-9234198
6	MS/PHD student	Female	Engr. Ms Nosheen Bibi	Researcher	Mechanical Engg	0312-9598265
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Dr. Khizar Azam			091-9222215
8	Director ORIC/QEC	Male	Prof. Dr. Abdul Shakoor			3455646565

Name of University	Hazara University, Mansehra					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Bilal Afsar	Asst. Prof.	Mgmt. Sc.	0336-1569586
2	Faculty Member/Researcher	Female	Dr. Sadia Tabassum	Asst. Prof.	Zoology	0300-9712246
3	Registrar	Male	Lt. Cdr. (R) Dr. Mahmood Khan	Registrar	Registrar Office	0300-2355036
4	Treasurer	Male	Mr. Khurram Jamal	Treasurer	Treasurer Office	0321-9129007
5	MS/PHD student	Male	Mr. Muhammad Waseem	PhD Scholar	Mgmt. Sc.	0313-5551030
6	MS/PHD student	Female	Ms. Mehreen Iftikhar	PhD Scholar	IT	
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Lt. Cdr. (R) Dr. Mahmood Khan	Registrar	Registrar Office	0300-2355036
8	Director ORIC/QEC	Male	Prof. Dr. Fida Abbasi	Dean Health Sc.	Agriculture	0342-9460029

PUNJAB						
Fatima Jinnah Women University, Rawalpindi						
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Mr. Shehryar Naveed	Assistant Professor	Public Administration	3349081732

2	Faculty Member/Researcher	Female	Ms. Qurat ul Ain	Assistant Professor	Computer Science	3333687471
3	Registrar	Female	Ms. Farzana Akhtar	Deputy Registrar	Registrar Office	3009756249
4	Treasurer	Female	Ms. Sadaf Zahid	Deputy Treasurer	Treasurer Office	3325479689
5	MS/PHD student	Male	Sadia Batool	PhD Student	Environmental Sciences	333-5239388
6	MS/PHD student	Female	Yasmin Akhtar	PhD Student	English	3325409583
Workshop Day 2: April 11, 2019						
7	Registrar	Female	Ms. Farzana Akhtar	Deputy Registrar	Registrar Office	3009756249
8	Director ORIC	Male	Dr. Shoaib Akhtar	Director ORIC	ORIC	3335985866

Name of University	**Government College University, Faisalabad**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Babak Mahmood	Associate Professor	Sociology	0300-8669998
2	Faculty Member/Researcher	Female	Dr. Salma Sultana	Associate Professor	Zoology	0300-6627246
3	Registrar		Mr. Ghulam Ghous	Registrar	--	0333-8960648
4	Treasurer		Mr. Muhammad Akbar Ali	Traesurer	--	0333-9933503
5	MS/PHD student	Male	Mr. Touheed Asghar	PhD	Applied Chemistry	0333-8980801
6	MS/PHD student	Female	Ms. Nabeela Ilyas	PhD	Applied Chemistry	0301-7008552

Workshop Day 2: April 11, 2019						
7	Registrar		Mr. Ghulam Ghous	Registrar	--	0333-8960648
8	Director ORIC		Dr. Khalid Mahmood Zia	Director ORIC	--	0336-6215848

Name of University	Government College Women University, Faisalabad					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Female	Dr. Shahla Qasim	Assistant Professor	English	Nill
2	Faculty Member/Researcher	Female	Ms. Iram Waqar	Assistant Professor	Economics	Nill
3	Faculty Member/Researcher	Female	Dr. Syeda Samina Tahira	Assistant Professor	Education	Nill

	Name of University: Information Technology University of the Punjab, Lahore					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Abu Bakar	Assistant Professor	Humanities & Social Sciences	042-99046038
2	Faculty Member/Researcher	Female	Dr.Izza Aftab	Chairperson Ecnomics Department	Ecnomics	042-99046037
3	Registrar	Male	Zaheer Sarwar			042-99046002
4	Treasurer	Male	Manak Sher Idrees Tard			042-99046065
5	MS/PHD student	Male	Abdulla Mahmood			

6	MS/PHD student	Female	Anum Afzal			
Workshop Day 2: April 11, 2019						
1	Registrar	Male	Zaheer Sarwar			042-99046064
2	Director ORIC	Male	Dr.Saeed Ul Hassan			042-99046023

Name of University	**Lahore College for Women University, Lahore**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Female	Prof.Dr.Shagufta Naz	Director Research	Research Office	0334-4212129
2	Faculty Member/Researcher	Male	Dr.Abuzar Fahiem	Chairperson	Computer Science	0300-4267995
3	Registrar	Female	Ms.Uzma Batool	Registrar	Registrar Office	0333-4731466
4	Treasurer	Male	Mr.Abdul Ghaffar	Treasurer	Treasurer Office	0321-9460159
5	MS/PHD student	Female	Ms.Kiran Shahzad	Phd Scholar	Zoology	0323-4741843
6	MS/PHD student	Female	Ms.Mehwish Aftab	Phd Scholar	Biotechnology	0332-4743946
Workshop Day 2: April 11, 2019						
7	Registrar	Female	Ms.Uzma Batool	Registrar	Registrar Office	0333-4731466
8	Director ORIC	Female	Prof.Dr.Farkhanda Manzoor	Director ORIC	ORIC	0333-4583936
9	Senior Manager	Female	Prof.Dr.Zohra Kiyani	Senior Manager research Operations	ORIC	0322-4042222

Name of University	The Govt. Sadiq College Women University Bahawalpur					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Muhammad Sadiq	Associate Professor	Mathematics	3213280321
2	Faculty Member/Researcher	Female	Dr. Saima Anjum	Assistant Professor	Chemistry	3317550707
3	Registrar	Female	Prof. Nasim Akhtar	Acting Registrar	Regsitrar Office	3336386625
4	Treasurer	Male	Mr. Saeed Anwar	Acting Traesurer	Treasurer Office	3346078974
5	MS/PHD student	Female	Zainab Shahzad	MS Student	Mathematics	3030983322
6	MS/PHD student	Female	Amiza Tahir	MS Student	Chemistry	3104613116
Workshop Day 2: April 11, 2019						
3	Registrar	Female	Prof. Nasim Akhtar	Acting Registrar	Regsitrar Office	3336386625
8	Director ORIC	Male	Prof. Dr. Faiz-ul-Hassan Nasim	Director ORIC	Office of ORIC	3336386356

Name of University:	The Women University Multan					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Female	Dr. Sara Musadiq	Assistant Professor	Chemistry	3360791356
2	Faculty Member/Researcher	Female	Dr. Aita Iqbal	Assistant Professor	MMG	3370626401
3	Registrar	Female	Prof. Samina Saleem	Registrar	Registrar Office	3366047330

4	Treasurer	Male	Mr. Ejaz Hussain	Treasurer	Treasurer Office	3065268881
5	MS/PHD student	Female	Ms. Saira Saeed	PhD scholar	MMG	3370626401
6	MS/PHD student	Female	Ms. Shafaq Saleem	PhD scholar	Chemistry	3166111545
Workshop Day 2: April 11, 2019						
1	Registrar	Female	Prof. Samina Saleem	Registrar	-	336647330
2	Director ORIC/QEC	Female	Dr. Malika Rani	Assistant Professor	Physics	3347180808

Name of University:	**University of Veterinary and Animal Sciences, Lahore**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Dr. Haroon Akber	Assistant Professor	Parasitology	0301-8133268
2	Faculty Member/Researcher	Female	Dr. Hafsa Zaneb	Associate Professor	Anatomy & Histology	0333-4754737
3	Administration	Male	Sajjad Hyder	Registrar	Registrar's Office	0333-4238716
4	Administration	Male	Dr. Zubair Farooq	Treasurer	Treasurer's Office	0333-4357198
5	MS/PHD student	Male	Dr. Nouman Rauf	Nil	Parasitology	0308-4091356
6	MS/PHD student	Female	Dr. Fakhra	Nil	Pathology	0355-7400919
Workshop Day 2: April 11, 2019						
3	Administration	Male	Sajjad Hyder	Registrar	Registrar's Office	0333-4238716
8	Director ORIC	Male	Dr. Muhammad Imran Rashid	Director	ORIC	0300-4259671

Name of University:	**THE ISLAMIA UNIVERSITY OF BAHAWALPUR**
Workshop Day 1: April 10, 2019	

Sr.	Nomination	Gender	Name	Designation	Department	Contact No.
1	Faculty Member/Researcher	Male	Prof. Dr. Muhammad Amjad	Incharge Faculty of Engineering	University College of Engineering & Technology (UCE&T)	Ph: 062-9255474 Cell: 0345-9441-806
2	Faculty Member/Researcher	Female	Dr. Jawad Iqbal	Chairman	Department of Management Sciences	Ph: 062-9255538 Cell: 0345-9441-812
3	Registrar	Male	Mr. Shahzad Ali Gill	Registrar	Registrar Office	Ph: 062-9250235 Cell: 0345-9440-759
4	Treasurer	Male	Mr. Shahid Mahmood Khan	Treasurer	Accounts Department	Ph: 062-9250245 Cell: 0345-9440-636
5	Director (QEC)	Male	Dr. Saeed Ahmad Buzdar	Director (QEC)	Directorate of QEC	Ph: 062-9250237 Cell: 0300-8682973
6	Director (IT)	Male	Mr. Zulfiqar Saeed	Director (IT)	Directorate of Information Technology (IT)	Ph: 062-9255483 Cell: 0345-9440-953
Workshop Day 2: April 11, 2019						

7	Registrar	Male	Mr. Shahzad Ali Gill	Registrar	Registrar Office	Ph: 062-9250235 Cell: 0345-9440-759
8	Director ORIC	Male	Prof. Dr. Muhammad Ashraf	Director (ORIC)	Directorate of Research, Innovation & Commercialization (ORIC)	Ph: 062-9250340 Cell: 0345-9440-655 0301-7736-059

Name of University:	**UNIVERSITY OF THE PUNJAB, LAHORE**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Senior Faculty Member	Female	Prof. Dr. Nasira Jabeen	Director, Institute of Administrative Sciences	Institute of Administrative Sciences	0300-8417359
2	Senior Faculty Member	Male	Prof. Dr. Mubbsher Munawar Khan	Dean, Faculty of Commerce & Principal	Hailey College of Banking & Finance	0323-5665534
3	Registrar	Male	Dr. Muhammad Khalid Khan	Registrar	Office of the Registrar	0315-8333800
4	Treasurer	Male	Rao Muhammad Tahire Rafique	Treasurer	Office of the Treasurer	0333-4652073

5	MS/PHD student	Male	Syed Shoaib Zubair	Scholar PhD Management	Institute of Administrative Sciences	0321-4037690
6	MS/PHD student	Female	Ms. Amna Siddique	Student, Master of Public Administration (MPA)	Institute of Administrative Sciences	0322-4954690
Workshop Day 2: April 11, 2019						
1	Registrar	Male	Dr. Muhammad Khalid Khan	Registrar	Office of the Registrar	0315-8333800
2	Director ORIC/QEC	Male	Syed Shoaib Zubair	Scholar PhD Management	Institute of Administrative Sciences	0321-4037690

Name of University	**University of Agriculture Faisalabad**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1.	Faculty Member/Researcher	Male/ Female	Dr. Sana Sehar,	Lecturer,	Department of Resource Economics	0334-6969741
2.	Faculty member/Researcher	Female	Dr. Irshad Bibi,	Assistant Professor	Institute of Soil & Environmental Sciences	0333-6597761
3.	Registrar		Mr. Tariq Mahmud Gill (rep.of Registrar)	Deputy Registrar (Admn.)	Admn.	0321-7611837

4.	Treasurer		Mr. Muhammad Tariq Saeed,	Treasurer	Treasurer Office	0333-4794059
5.	MS/PHD Student	Male	Mr. Muhammad Awais	PhD, Students Reg.No.11-ag-3338	Institure of Soil and Environmental Sciences	0321-9666952
6.	MS/PHD Student	Female	Miss Ayesha A-Waris	PhD, Students Reg.No.15-ag-0007	Institure of Soil and Environmental Sciences	0323-5310167
Workshop Day 2: April 11, 2019						
7.	Registrar		Mr. Tariq Mahmud Gill (Rep.of Registrar)	Deputy Registrar (Admn.)	Admn.	0321-7611837
8.	Director ORIC		Prof. Dr. Zahir Ahmad Zahir,	Director	Office of Research Innovation and Commercializatio n (ORIC)	0300-7664951

SINDH						
Name of University	**IBA SUKKUR**					
Workshop Day 1: April 10, 2019	**Nomination**	**Gende r**	**Name**	**Designation**	**Department**	**Contact No.**
1	Faculty Member/Researcher	Male	Prof. Dr. Abdul Rehman Soomrani	Professor	Computer Science	3336662428

2	Faculty Member/Researcher	Male	Dr. Sher Muhammad Daudpota	Director, QEC	QEC	3312791151
3	Faculty Member/Researcher	Female	Dr Zarqa Bano	Assistant Prof.	Mathematics	3333663579
4	Registrar	Male	Engr. Zahid Hussain Khand	Registrar	Administration	3009312114
5	Treasurer	Male	Mr. Feroze Ali Mahar	Treasure	Finance	3313060105
6	MS/PHD student	Male	Mr. Jahanzeb	PhD Student	Business Administration	3139040039
7	MS/PHD student	Female	Ms. Noreen Fatima	MS Student	Computer Science	3363618193
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Engr. Zahid Hussain Khand	Registrar	Administration	3009312114
8	Director ORIC	Male	Prof. Dr Pervaiz Ahmed Memon	Director, ORIC	ORIC	3337192266

Name of University	**NED University of Engineering & Technology, Karachi**					
Workshop Day 1: April 10, 2019	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
Sr.	Faculty Member/Researcher	Male	Dr. Zahoor ul Hussain Awan	Associate Professor	Chemical Engineering	0333-2391166
1	Faculty Member/Researcher	Female	Dr. Suneela Ahmed	Assistant Professor	Architecture	0300-2209581

2	Registrar	Male	Mr. Ghazanfar Hussain	Registrar	Registrar Office	0321-2393354
3	Treasurer	Male	Mr. Muhammad Sajeeruddin	Director Finance	Directorate of Finance	0300-2020247
4	MS/PHD student	Male	Mr. Munir Ahmed	Assistant Professor / Ph.D. Scholar	Automotive & Marine Engineering	0322-8239492
5	MS/PHD student	Female	Ms. Urooj Ainuddin	Assistant Professor / Ph.D. Scholar	Computer & Information Systems Engineering	0300-2344670
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Mr. Ghazanfar Hussain	Registrar	Registrar Office	0321-2393354
8	Director ORIC	Male	Dr. Syed Mehmood Hassan	Director ORIC	Office of ORIC	0300-2131121

Name of University	**Shah Abdul Latif University Khairpur Sindh Pak**					
Workshop Day 1: April 10, 2019						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**

1	Faculty Member/Researcher	Male	Prof. Dr Maqsood Zia Shah	Director	Ghotki Campus of Shah Abdul Latif University Khairpur	3009050999
2	Faculty Member/Researcher	Female				
3	Registrar		Prof. Dr. Asad Raza Abdi	Registrar	Shah Abdul Latif University Khairpur	3368629257
4	Treasurer		Mr. Maqsood Ahmed Memon	Bursar	Finance Wing of Shah Abdul Latif University Khairpur	3009318464
5	MS/PHD student	Male	Mr. Barkatullah Qureshi	PhD Student	Economics of Shah Abdul Latif University	3009318697
6	MS/PHD student	Female	Ms Yasmeen Ruk	PhD Student	Economics of Shah Abdul Latif University	
Workshop Day 2: April 11, 2019						
3	Registrar	Male	Prof. Dr. Asad Raza Abdi	Registrar	Shah Abdul Latif University Khairpur	3368629257
8	Director ORIC	Male	Prof Dr. Ghulam Abbas Shar	Director ORIC	Shah Abdul Latif University Khairpur	3003125046


HIGHER EDUCATION COMMISSION


HEC-Lecture Hall
HEC RC Quetta
UNIVERSITY OF HA
SAU Tandojam
UVAS-Lahore
UOB-Quetta@ PERN
LUAWMS-Lasbela
UET Peshawar
UVAS-Lahore
LCWU-Lahore
SAU Tandojam

Annexure 8 – List of Participants from Stakeholder Consultations – Affiliated Colleges and Provincial Higher Education Departments

The Consultations were facilitated by the following team members from HEC

Sr. No.	Name	Designation	Email	Contact No.	Relevant Component
1	Mr. Fida Hussain	DG (Learning Innovation)	fhussain@hec.gov.pk	051-90402100	Component 2
2	Mr. Abdullah Fayyaz Chattha	Director (IT)	achattha@hec.gov.pk	051-90402212	Component 2.4, Component 3
3	Ms. Noshaba Awais	Director (R&D)	nawais@hec.gov.pk	051-90401905	Component 1

4	Mr. Fawad Raza	Dy. Director (IT)	fawadraza@hec.gov.pk	051-90402265	Component 2.4, Component 3
5	Mr. Rizwan Rashid	Consultant (IT)	rrashid@hec.gov.pk	051-90402266	Component 4
6	Ms. Khushbakht Ejaz	Assistant Director (A&C)	kejaz@hec.gov.pk	051-90401609	Coordination and Administrative support

The participants from Affiliated Colleges and Provincial Higher Education Departments are given in the table below:

Khyber Pakhtunkhwa

Workshop Day: April 11, 2019						
Higher Education Department of Khyber Pakhtunkhwa						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Officer # 1	Male	Muhammad Roz Khan	Additional Director Academics	Directorate of Higher Education Peshawar	0315-6758899
2	Officer # 2	Female	Seema Rehman	BS Coordinator	Directorate of Higher Education Peshawar	0336-9092889
Name of College (1) for Men	Govt. Degree College Hayatabad					
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
3	Principal/Vice Principal	Male	Abdul Jabbar	Professor	Botany	0333-9103767

4	Faculty Member	Male	Nasir Noor	Assistant Professor	Statistics	0336-9459189
5	Faculty Member	Male	Dr. Sarir Ud Din	Associate Professor	Physics	0333-5340406
6	BS Student	Male	Muhammad Umeed Khan	BS Student (6th Semester)	Physics	
7	BS Student	Male	Manzoor Ali	BS Student (3rd Semester)	Economics	0317-9744031

Name of College (2) for Men	Govt. Superior Science College Peshawar					
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
8	Principal/Vice Principal	Male	Nasrullah Khan	Prof/Principal		0333-0323737
9	Faculty Member	Male	Abdul Saboor	Chair QAC	Computer Science	0300-5878650
10	Faculty Member	Male	Atiq Ullah Jan	BS Coordinator	Mathematics	0331-5578780
11	BA/MA Student	Male	Shayan Ali Kiyani	BS Student (8th Semester)	Computer Science	0315-7808074
12	BSc/MSc Student	Male	Muhammad Ikram	BS Student (8th Semester)	Pakistan Studies	0314-9052533

Name of College (1) for Women	Govt. Frontier College for Women Peshawar					
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
13	Principal/Vice Principal	Female	Roshan Zuhra	Associate Professor	Urdu	0345-9187091
14	Faculty Member	Female	Shahida Gillani	Professor	Home Economics	0300-5975897
15	Faculty Member	Female	Humaira Naz	Associate Professor	English	0334-5021443
16	BA/MA Student	Female	Salma Ayaz	BS Student (8th Semester)		
17	BSc/MSc Student	Female	Ruhi Khan	BS Student (8th Semester)		

Name of College (2) for Women	Govt. Girls City College Gulbahar Peshawar					
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
19	Principal/Vice Principal	Female	Shaheen Umar	Principal	Urdu	0335-0920036
20	Faculty Member	Female	Mehwish	Assistant Professor	Zoology	
21	Faculty Member	Female	Haleema	Lecturer	Zoology	

22	BA/MA Student	Female	Hanfa	BS Student (8th Semester)	English	
23	BSc/MSc Student	Female	Sana	BS Student	English	

Punjab

Workshop Day: April 11, 2019

Higher Education Department of "*Punjab*"

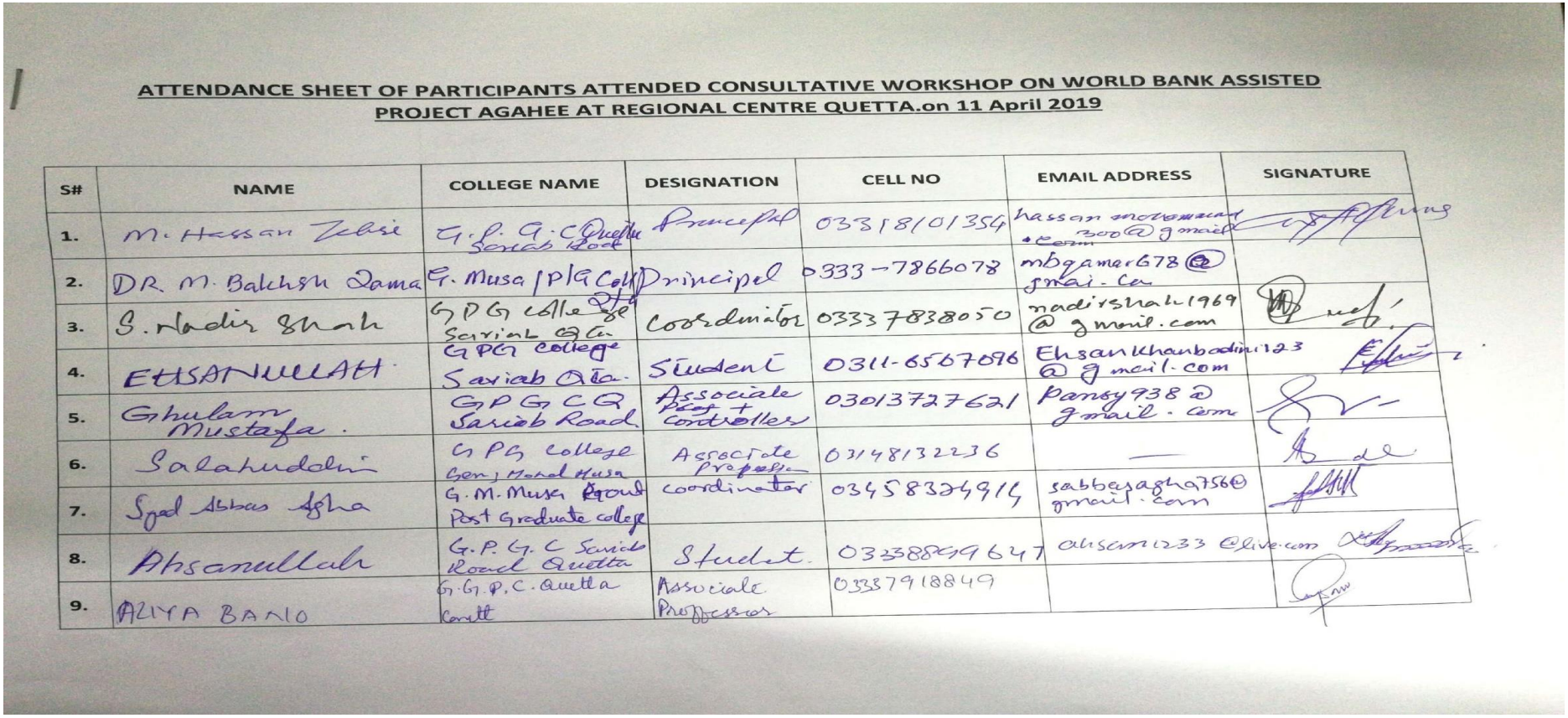
Queen Mary College, Lahore.						
Sr.	**Nomination**	**Gender**	**Name**	**Designation**	**Department**	**Contact No.**
1	Principal/Vice Principal	Female	Dr. Irfana Mariam	Professor	HED, Punjab	3334399613
2	Faculty Member	Female	Ms. Shabana Saif	Associate Prof	English	3349938271
3	Faculty Member	Female	Madiha Qayyum	Lecturer	Psychology	3474757671
4	Faculty Member	Female	Ayesha Sajid	Lecturer	Pol. Science	3344989890
5	MA Student	Female	Alina Ashraf		Pol. Science	4236317078
6	MSc Student	Female	Samiya Rehab		Psychology	4236317078

Consultative Workshop on World Bank Assisted Project "AGAHEE"

April 11, 2019

S. No	Name & Designation	Institution	Contact Number
1	Prof. DR. FARHAN EBADAT YAR KHAN PRINCIPAL M.A.O. College	M.A.O. College Lahore	0321-4424517
2	Prof. Dr Haleema Afridi Principal	Govt. Post Graduate College For women Samanabad	03334274357
3	Faiza Bashir	GCW, Township	0333-4101052
4	Shabana Saif	Queen Mary College LHR	03349938271
5	Ayesha Sajid	Queen Mary College, Lahore	0334-4989890
6	Madiha Qayyum Lecturer	Queen Mary college, Lahore	0347-4757671
7	Iffat Saeeda	Govt. Postgraduate college For Women Samanabad Lhr	0331-5932509
8	Mrs Asma Parveen	Govt Postgraduate college (w) samanabad LHR	0334-7514291
9	Mahnoor Khalid	Govt. Postgraduate College (w) samanabad LHR	0324-8665891
10	Kinza Javed	Govt. Post graduate college (w) Samnabad	0304-0117200
11	Alina Ashraf	Queen Mary college Lahore	0332-4831613
12	Samiya Rehman	Queen Mary College LHR	0331-6515086
13	Zahid Shah	Govt college Township LHR.	0333-5115155
14	M. Raza	Govt College Township Lahore	0308-4557202
15	Dr. Asim Hameed Butt	Govt. College Township, Lahore	0300-4250169
16.	Dr. Qamar Subhani	Govt. College Township, Lhr.	0308-4334141
17.	Dr Ijaz Butt.	G.C. Township	03009439384
18	Prof. Dr. Irfana Mati	Principal. Queen Mary College LHR	0333-4399613

Balochistan



ATTENDANCE SHEET OF PARTICIPANTS ATTENDED CONSULTATIVE WORKSHOP ON WORLD BANK ASSISTED PROJECT AGAHEE AT REGIONAL CENTRE QUETTA.on 11 April 2019

S#	NAME	COLLEGE NAME	DESIGNATION	CELL NO	EMAIL ADDRESS	SIGNATURE
1.	M. Hassan Zehri	G.L.G.C Quetta Sariab Road	Principal	03318101354	hassan.mohammadzai300@gmail.com	
2.	DR. M. Bakhsh Dama	G. Musa P/G Coll	Principal	0333-7866078	mbgamar678@gmail.com	
3.	S. Nadir Shah	G P G College Sariab Quetta	Coordinator	03337838050	nadirshah1969@gmail.com	
4.	EHSANULLAH	G PG College Sariab Qta.	Student	0311-6567096	Ehsankhanbadini123@gmail.com	
5.	Ghulam Mustafa.	G P G C Q Sariab Road.	Associate Prof + Controller	03013727621	Pansy938@gmail.com	
6.	Salahuddin	G PG College Gen; Mohd Musa	Associate Professor	03148132236	—	
7.	Syed Abbas Agha	G.M. Musa Ground Post Graduate college	coordinator	03458324916	sabbasagha756@gmail.com	
8.	Ahsanullah	G.P.G.C Sariab Road Quetta	Student	03338849647	ahsan1233@live.com	
9.	ALIYA BANO	G.G.P.C. Quetta Cantt	Associate Professor	03337918849		

10.	Sajida Bukhari	G.G. Post graduate College Qta Cantt.	Professor	03368222718	Sajidabukhari293@gmail.com	
11.	Furquana Tarannum	G.G.P.G.C Qta Cantt	Principal	03337827330	furquanatarannum@gmail.com	
12.	Zainab Kalimullah	G.G. Quetta Qta.	B.S English student	03332231504	"	Zainab
13.	Asma Saleem	G.G. Deg-Quarry	BS. Eng) Stud	0333-7825898	"	Asma Saleem
14.	Maria Farhan	G.G. Deg C. Quarry	Assistant Prof	03368063039	mariafarhan11@gmail.com	
15.	Amber Nigam	G.G. D.Q.C	Associate Prof	03337804169	ambernigam1@yahoo.co.uk	
16.	Sayjeeda Almas.	G.G.D.C. Q.Q.	Principal	03342523502	Cheemvalley_02@yahoo.com	
17.	Ayesha Gul	Govt. Girls Past Graduate Clg Qta Cantt	BS. Eng Student	03448180570	"	
18.	Fatima Adeela	Govt. Girls Past Graduate clg Qta cantt	B.S (Botany) 5th semester student	03023830451	"	
19.						
20.						
21.						


HIGHER EDUCATION COMMISSION
REGIONAL CENTER QUETTA
HEC RC Quetta
HEC RC Quetta


HIGHER EDUCATION COMMISSION
HEC Lecture Hall
HEC RC KHI
SBBWU-Peshawar
UVAS-Lahore
UET Peshawar