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Generating Global
Environmental Benefits - GEB

POLICY ANALYSIS FOR IDENTIFYING THE KEY POLICY SHIFTS OR MAJOR DEVELOPMENTS THAT ARE REQUIRED TO INTEGRATE ENVIRONMENT & DEVELOPMENT IN KP PROVINCE

A STUDY CONDUCTED BY GEB PROJECT THAT REVIEWED THE CURRENT SYSTEM OF DATA COLLECTION, GENERATION AND ANALYSIS, IDENTIFIED AREAS OF IMPROVEMENT AND RECOMMENDED POLICY ACTIONS REQUIRED FOR THE ESTABLISHMENT OF AN INTEGRATED EIMS IN KP PROVINCE

GEB - A Joint Initiative of United Nations Development Programme (UNDP) & Ministry of Climate Change (MoCC)

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Acronyms

AWP: Annual Work Plan

EIA: Environmental Impact Assessment

EIS: Environmental Information System

EPA: Environmental Protection Agency

EPI: Environmental Policy Integration

ESD: European Soil Database

GEB: Generating Global Environment Benefits

GEF: Global Environment Facility

IEE: Initial Environmental Examination

KP: Khyber Pakhtunkhwa

KP-EPA: Khyber Pakhtunkhwa- Environmental Protection Agency

MOCC: Ministry of Climate Change

NCS: National Conservation Strategy

NCSA: National Capacity Self-Assessment

NEQS: National Environmental Quality Standards

PEPA: Pakistan Environmental Protection Act

PEPC: Pakistan Environmental Protection Council

PIF: Project Identification Form

PM&RU: Performance Management & Reforms Unit

PMU: Project Management Unit

SOPS: Standard Operating Procedures

SEIS: Shared Environmental Information System

TORs: Terms of References

UNDP: United Nations Development Program

WISE: Water information system for Europe

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Executive Summary:

Effective environmental policy benefits society by protecting human health and the environment. But for progress to be made across environmental policy areas (whether air quality, water, waste or biodiversity) cross-cutting, systemic flaws need to be addressed regularly. Rules and regulations need to be clear, feasible and enforceable. Policy instruments must be well designed and packaged. Implementation required should be supported by adequate compliance assurance strategies. All this requires effective supporting institutions, adequate funds and enough human resources.

Good environmental regulations have long lasting implications in achieving Political, Economic and Public Administration goals. Environmental policies are needed because environmental values are usually not considered in organizational decision making Process. It is imperative to have effective & appropriate environmental policies, because without it, natural resources can be exploited easily and even at faster rate.

In Pakistan, unplanned industrialization and rapid population is stressing the available resources, deteriorating environment and affecting public health in variety of ways. This can be tackled by integrating environmental policies into economic decision-making process.

Furthermore; Khyber Pakhtunkhwa (KP) Province, which is among the most vulnerable provinces of Pakistan to the negative impacts of Climate Change, needs much attention in terms of effective environmental policies. In order to tackle the prevailing environmental challenges of the province, Academia, Public sector organization, Industries and International donor agencies shall put their energies

together to develop a centralized mechanism for the environmental data generation, collection, storage, dissemination and incorporation into economic decision-making process.

Moreover, the existing environmental policies being practiced by Khyber Pakhtunkhwa government needs to be analyzed, identify shortcomings and suggest improvements accordingly. In this regards, the Ministry of Climate Change (MoCC) together with the United Nations Development Program (UNDP) has taken an initiative to launch Generating Global Environment Benefit (GEB Project). The purpose of the project is to introduce an advance Environmental Information & Management System (EIMS) into existing government machinery, with the idea to integrate environment and development.

Pursuant to the Annual Work Plan (AWP-2019) activity 2.2.2, of the GEB project, which aims to conduct a "***Policy analysis for identifying the key policy shifts or major developments that are required to integrate environment & development in KP Province***" so that the same may be further explored for improvement in Pakistan.

In this regard a holistic approach was adopted to conduct this study. Public sector organizations, researchers from academia and environmental practitioners were interviewed. Moreover; the existing set of rules and regulations pertaining to environment were critically reviewed with the perspective of EIMS. After conducting the study, it was determined that the set of rules & regulations being implemented by various public sector organizations are contributing to environmental protection; however, it does not cover the needs of an advance EIMS, because most to the regulations are outdated. It is therefore recommended that existing rules and regulations needs to be revised, keeping in mind the

prevailing environmental challenges of the country in general and KP in Particular. A conceptual framework regarding an effective EIMS has been suggested for the KP-Province following the basic principle of Shared Environmental Information System (SEIS), which is currently being used by the European countries.

Furthermore, it has also been suggested that, the EIMS needs to be incorporated into the KP-Digital Policy by seeking expertise from the various line departments, academia and practitioners from the industry.

1. Introduction

The need for consistently available environmental information to support mainstreaming of environment in economic development has been recognized in National Conservation Strategy (NCS) and all subsequent policy initiatives of National Environment Action Plan (NEAP), Provincial Conservation Strategies (PCS), forest policy, climate change policy and notably the National Capacity Self-Assessment (NCSA).

Pakistan's environmental policy and legal context has significantly evolved over the years. Several of the environment related legislations such as Pakistan Forest Act and Irrigation Act date back to the time before the creation of Pakistan in 1947. Many other policies and legislation have been enacted since then.

Shortly after the 1972 Stockholm Summit on Environment, Pakistan rewrote its constitution in 1973 backed by a strong consensus in the country. In the ensuing years, environmental movement gathered movement globally and in Pakistan leading to the enactment of the Pakistan Environment Protection Ordinance in 1983 that was later replaced by a more comprehensive Pakistan Environment Act 1997.This was paralleled by complementary legislation and policy development at the provincial level. It was through these legislations that the environment protection agencies were created at the federal and provincial level.

Establishment of National Environmental Quality Standards (NEQS) and Environmental Impact Assessment (EIA) requirements for development projects are important parts of the country's environmental architecture. Meanwhile some of the previous legislations such as the Forest Act have continued to be updated and new significant legislations such as National Drainage Act 1997 and provincial wildlife acts introduced. Much of this was enabled by the process and outcome of

the Pakistan National Conservation Strategy. The provincial conservation strategies that followed have served as the provincial policies on environment.

Furthermore; the National Environment Policy (NEP) was approved by the federal Government in 2005. The policy's subsidiary papers, strategies, and plans provide an adequate framework for addressing a comprehensive range of environmental issues. However, the NEP does not prioritize or assign responsibility for certain tasks to specific institutions and agencies. It appears to rely on the voluntary implementation of its recommendations by federal, provincial, and local government agencies and other stakeholders, nor it is a principal planning or development document; it was apparently not produced in time to influence the Planning Commission.

Sector-specific policies, in areas such as water, power, oil and gas, and housing, elaborate the Government's priorities for key sectors of the economy ***(O'Rourke, 1995).*** These policies derived from internal government and stakeholder-based consultations, but in most cases protecting the environment is not their key focus; indeed, any reference to the environment is by default rather than by design. Sector policies assume that thematic policies, such as the NEP, will ensure that the environmental aspects of public decision-making are given adequate consideration. This represents a significant policy discord. For example, a water sector policy that subsidizes tube well operation by imposing a flat-rate electricity charge could lead to the drawdown of water. In some critical locations, groundwater sources are dangerously close to depletion (***ADB 2008***).

More widespread is the looming threat of saline water intrusion into zones of fresh groundwater that underlies arable soils. All these issues can potentially create severe environmental problems. Sector-specific policies and legislation therefore

need to be reviewed (i) specifically, to align them with the NEP and Pakistan Environmental Protection Act (PEPA) 1997, and (ii) generally, to ensure that they reflect the belief of sustainable development.

Environmental outcomes are influenced by the level of environmentally damaging activities and environmental policies, regulations and institutions, which are critical mediation factors. Institutional performance is one of the critical factors that determine environmental outcomes. Institutions are responsible for enforcing government policies, and consequently institutional design affects environmental outcomes ***(Paavola, 2007).*** To discharge their mandates effectively, institutions required adequate human, physical and financial resources, backed by legislative authority.

The current era is called information and communication era as many studies are conducted regarding the collection; processing and transferring information. Planning and control cannot be treated separately. To fulfill the planning and control process in each organization/department, various kind of data should be collected from inside and outside of the department and be transferred to the system doing information processing via the communication channel. The information processing should be as the system can present the necessary, timely and adequate information for decision making and present to the decision makers ***(Bahman, 1991).***As having un-necessary information leads into the immersing of the manager in information and his confusion and continuance of the activities of some of the activities disturbs the organization/department. Incomplete information disturbs the planning, control and decision making and makes it ineffective as scientifically and practically ***(Eisenhardt & Zbaracki 1992).***

The management information systems increased the managers' information and even the experts of various levels of the organizations, which extend help in further decision making process. Preliminarily, it is inherent to state that decision making is an integral part of any business. This is because a majority of operations in an organization revolve around decisions made by the management and other key stakeholders inside or outside the organization. And in order for decision to be made adequately, it is vital for there to be a good information system since decisions are based on information available ***(Babaei, & Beikzad 2013).***

However, Environment became provincial subject after the 18th constitutional amendment. The KP Environmental Protection Act, 2014 having been passed by the Provincial Assembly of KP on 25th November 2014 and approved by the Governor of the province on 4th December 2014 as an Act of Legislature of Province. Therefore, KP is sole responsible for the environmental protection of the province.

1.1. Purpose of the study:

The purpose of the study was to determine the key policy shifts or major development that is required to integrate environment and development.

1.2. Purpose of the Project:

The purpose of the project is to strengthen national capacities and mainstream environmental concerns into national development plans and implementation systems.

1.3. Goals & Objectives of the Project:

The project's overall goal is 'Generating Global Environmental Benefits from Improved Decision Making in Pakistan'. Its more specific objective is 'to remove the barriers to environmental information management and mainstreaming global environment concerns into economic decision making'. The objective is two-fold in its focus, one related to environmental information, and the other to employing this information for improved economic decision making. The project will thus have two inter-related components of: (a) establishing a robust environmental information management system; and (b) stimulating commitments and filling gapes in capacities for integrating environment and development as laid down in Project Identification Form (PIF).

1.4. Expected Outcomes:

The project will have three interrelated outcomes:

i. Regular availability of consistent and reliable environmental data;
ii. A coordinated and robust environmental information management system, and,
iii. Enhanced commitment and capacity for sustainable development planning and legislation.

1.5. Introduction to EIMS:

Managing vast amounts of environmental information associated with the environmental investigations, emissions tracking and monitoring is a never-ending repetitive task for environmental practitioners. All too frequently, several spread sheets or expensive special program or manual files are used, resulting in a cumbersome, expensive and hectic record management exercise.

The Environmental information management system (EIMS) is a software application that facilitates environmental data acquisition and management; assists environmental and senior management in making fast and meaningful interpretation and reporting of collected environmental information. The objective of establishing such a central repository is to allow the organization to assess environmental performance of the facility at any given time, assess efficiency of the control equipment to take appropriate actions, manage audits, non-conformances & corrective actions and to optimize production practices to reduce emission/effluents levels. The overall objective in establishing such a system is to help an organization in meeting regulatory compliance requirement.

The key benefits of centralizing the environmental record management are that the process and production information is located in the same system environment. This enables efficient utilization and refining of generated information. For instances, combining selected environmental key figures with production information creates environmental performance indicators, which describes our operations better than simple emission or effluent record.

EIMS helps in maintenance of related records and utilized the advance features and tools to refine and analyze the information or non-compliance with respect to the regulatory compliance. The records held on EIMS can be accessed remotely on the computer using internet. In addition, by eliminating the need for paper, it provides a green solution to the problem of record keeping. User has unique, secure logins with different user levels and with different permission and data is routinely and automatically backed up.

EIMS functions as totally automated system for record processing backup, email alerts, schedule reports, monitoring schedules and management. Once monitoring

schedule is created, user can see what record has been received as well as when record is due to be collected and when record is outstanding. The system can also proactively send reminders and warnings to users according to data status and settings.

Furthermore, most commonly, EIS have been developed and installed to pursue one or more of the following goals;

a) **Off-line analysis systems**: Such systems are geared towards gathering historical data in a systematic way and making them available for in-depth analysis of natural phenomena.
b) **Real-time reporting systems**: These are systems responsible for identifying and reporting the current environmental conditions. They satisfy the public need for environmental awareness and the administrative and industrial needs for prevention measures.
c) **Early Warning Systems**: In this case, the goal is to predict the future conditions of the environment. The need to forecast and forewarn about potential environmental problems is the key for preserving nature and taking precautionary actions.

Until lately, environmental data were meant for environmental scientists occupied with off-line studies and post-processing activities in their effort to understand the natural phenomena involved. However, there has been a transition in this practice: The consequences of the growing societal interest in the environment and sustainable development were the emerging need for providing environmental information to the public. Worldwide there are numerous Environmental Information Systems such as European Soil Database (ESD), The Water Information System for Europe (WISE) and Air Quality in Europe among others

used for environmental data storage and dissemination. The need for the Environmental Information System in Pakistan is more important now than ever. Most of the departments store their data in hard form/files without a centralized and coordinated database system, which is why the same data resides in shelves without utilizing it for greater good. Environment Information system can serve a great tool to develop inter-agency coordination through a single data resource center and to disseminate the same data to a wider audience publicly.

1.6. Implementation of the Environmental Information System:

The implementation of the EIS is a part of the management process. This leads to organizational change and it can affect people and change their work style. The process of rising behavioral responses may bring favorable or unfavorable results depending on system implementation and strategies undertaken by organizational/departmental management. In the implementation process, system designers should ideally act as a change agent or catalyst. The successful implementation of EIS cannot be separated from their roles in addressing human factors carefully. The implementation process is also referred to "the process of information systems development". A new information system implementation is a significant investment for an organization/department. Because information system is a socio-technical system, the development should involve a combination design between activity system and ICT system. Moreover, the concept of EIS implementation process consists of five steps, as the following:

- Investigation
- Analysis
- Design,
- Implementation &

- Maintenance,

To identify problematic issues regarding the implementation of EIS, many problems in the implementation of EIS may come out from these issues. More specific categorization of the problems is management process, organizational/departmental environment, leadership willingness, and technical & personnel problems.

i. Management process problems focus on the functional operations of an organization/department such as budget, personnel, and general management.

ii. Organizational environment problems are identified as intangible factors such as organizational culture, the change, and behavior.

iii. Leadership problems related to executive organization/department interaction issues.

iv. Technical problems of the system mainly refer, to the hardware and software of information technology.

v. Personnel problem is individual issues in the organization/department.

Those problems have an impact on the planning, procurement, and deployment of information systems in organizations.

2 Methodology of the Study:

The study was carried out, following multiple approaches such as consultation meetings and interviews with the environmental experts from academia, public sector organizations & international organizations working for environment in the province. Furthermore, interviews with the technical team in key public sector organizations in the KP province were conducted. The interview was covering but not limited to the following;

i. Existing rules/regulations/guidelines being practiced in the public sector organizations.
ii. Prevailing set of rules/regulations/policies and incorporation of EIMS.
iii. Criteria of an organization to devise framework for an effective EIMS in KP.
iv. Requirement & recommendations of key public sector departments to integrate environment and development.

With the idea to avoid spreading the resources and maintaining the result orientation of the project; purposive sampling technique was adopted for the proposed survey. Earlier more than 15Nos. of government departments were selected, that are generating environmental data in one way or another, but on the basis of relevance with environment, key government departments were purposively selected. At each department, statistically 5% of the technical staff was interviewed. After detail survey and meetings with the concerned technical staff in respective department, the following situation was observed. Interviews were conducted with the following officials:

i. Officials of the Environmental Protection Agency
ii. Officials of the Forestry Department of KP,

iii. Officials of the Wild Life Department
iv. Officials of the Agriculture Extension Department
v. Officials of the Fisheries Department
vi. Officials of the On-farm Water Management Department
vii. Officials from Academia (University of Peshawar, University of Haripur etc.

2.1. Prevailing system for Data Generation, Database Management & Dissemination in KP:

After meeting the technical as well as clerical staff of the various departments, it was noted that environmental data in all the studied departments is stored in traditional filing system, where hard copies are maintained. This traditional practice is prevalent in every core government department where no advance database management system has been developed for efficient record keeping and interpretation into meaningful/useful information. Conversely, advance system for data management helps user to insert, delete or retrieve data whenever required. Manual documentation is ineffective and time-consuming practice. They need to organize and store the files; furthermore, immediate dissemination of information through manual record appears as to be a tiresome task. The discrepancy in a correct decision-making process is due to lack of database management and data accessibility. The issue needs to be addressed well in time for better and productive outcomes. The modern database management system is more implicit in controlling the data redundancy, consistency and sharing along with integrity, improved security & backup and recovery services. There will be increased productivity and accessibility through better responsiveness.

2.2. Status of the Data Collection, Generation & Environmental reporting:

The selected KP departments generate various kinds of data pertaining to environment in one way or another. All the data generated are then stored in a traditional filing system and hard copies are maintained. There is no advance database management system developed so far. However the Forestry department of KPK, has taken an initiative and started working to develop an advance Management Information System (MIS), with the help of which they will digitize their entire data. GIS based maps will be produced depending upon the need/purpose. Information enriched GIS based maps can help contribute in decision making process. Moreover; the Environmental Protection Agency (EPA-KP) which is the core department conducting environmental studies and research projects across the province. EPA has different functions; including administering and implementing the environmental protection act, ensuring ambient air emission, discharge standards as well as soil and water protection. EPA coordinates programs and policies related to environment nationally and internationally, similarly they designate laboratories where environmental analysis and test are conducted. Environmental Protection Agency (EPA) has taken necessary measures to look into the environmental issues of the province, but due to the lack of proper database management system, the agency does not create periodic environmental reports. This is evident from the fact that "Environmental Profile of Khyber Pakhtunkhwa", a comprehensive report on state of the environment is published every five years. This too contains freshly collected data regarding air, water and noise pollution, and doesn't essentially reflect the changes occurred over the course of five years profile period. Hard copies of the profile are available with the Agency and can be obtained upon request.

Whereas in case of Agriculture Extension department of the KP they produce regular reports on various aspects, additionally they do have a dedicated reporting department which is known as crop reporting services. All the reports are regularly shared with the provincial secretariat. However, the data or information cannot be retrieved by the public or academia due to the unavailability of data base management system.

2.3. Concept of EIMS in KP:

Most of the focal persons were unaware of the needed environmental information system. The system which is essential for better future performances through improved decision making process can be implemented once you have reliable and consistent data. The Forest department is working to introduce management information system; similarly, they are utilizing other advance software system like Geographic Information System (GIS) for mapping the forest resources under their jurisdiction. GIS is a powerful software technology that allows a virtually unlimited amount of information to be linked to a geographic location. Coupled with a digital map, GIS allows a user to see locations, events, features, and environmental changes with unprecedented clarity. Showing layer upon layer of information such as environmental trends, forest cover, soil stability, pesticide use, migration corridors, hazardous waste generators, dust source points, Lake remediation efforts, at-risk water wells and other similar areas. GIS technology offers a wide variety of analytical tools to meet the needs of many people, helping them make better decisions about the environment. In some cases, GIS is the only technology used in information systems. These systems are characterized by data and information that relate directly to the environment. The information is gathered through different means from satellite imagery to noise level probes. The

GIS is usually used as an overarching framework that brings the various data sets into an integrated database. These systems also focus on monitoring, analyzing and modeling.

Moreover, the PHE department is likely to launch e-governance system in proceeding future, with the help of which, the department would upload and share information on regular basis with more efficiency and ease. These and other individual efforts although worth praising do not essentially dictate the implementation of centralized resource information in the future until and unless all the relevant stakeholders agree upon. While interviewing the Deputy Director Plant protection, at Director General Agriculture (Agriculture Extension Department), he was of the view that presently we are having multiple platforms which includes;

- ***Tele farming:*** Through which farmers across the province share their issues or challenges and experts from the concern field respond to each query in specific time period.
- ***Bureau of Agriculture:*** This platform is being used to disseminate useful information among the farmers community across the province, specialized awareness sessions are conducted through radio and other possible means.
- ***Prime Minister Citizen Portal:*** Queries or complaint lodged by the public is timely addressed.

The Director further added that we have a specialized department that is crop reporting services, which used to report all kind of crop related issues/progress and shared with the provincial secretariat regularly both in soft & hard form. He was of the view the prevailing system in our organization serves the purpose and we do need to get into further complexities in the form of introducing new

software/technology into the existing system. However if the system is user-friendly and can help the performance of the department we will always welcome it.

2.4. File tracking system in KP:

In 2018, the Chief Secretary of the province has taken an initiated to launch a file tracking system for the government machinery. The basic idea behind the system was to expedite the file processing system. Processing a case/letter/file in a hard or manual form may take days to weeks while following the online tracking system may process the same file within a day or two. It was advised that the concerned administrative unit inside the organization will be responsible to keep the system operational. All the provincial departments have been made bound to dispose of file within a stipulated time. The Performance Management & Reforms Unit (PM&RU) was supposed to track all record and monitor individual performance. The system was kept alive for a couple of months but failed to achieve it intended purpose. The reason behind the failure of the system was lack of will of the top management of each government department.

2.5. Existing set of rules & Regulations in KP:

Effective environmental policy benefits society by protecting human health and the environment. But for progress to be made across environmental policy areas (whether air quality, water, waste or biodiversity) cross-cutting, systemic flaws need to be addressed. Laws and regulations need to be clear, feasible and enforceable. Policy instruments need to be well designed and packaged. Implementation needs to be supported by adequate compliance assurance strategies. All this requires effective supporting institutions.

Good environmental regulations have long lasting implications in achieving Political, economic and public administration goals. For countries seeking to make the most of globalization, environmental regulation plays an increasingly important role in guaranteeing a level-playing field for businesses in the global marketplace.

For countries aiming to strengthen the rule of law and improving governance, effective environmental compliance assurance systems help to reinforce the credibility of regulation in general. Moreover, in coming years the bar for governments in general and for environmental regulators in particular will be set higher – the public will demand better environmental performance, while businesses will expect policy solutions that minimize compliance costs and bureaucracy.

Generally, institutions suffer from weak authority, scarcity of resources, outdated management approaches, high turnover of professionals and frequent restructuring, thereby lacking both the incentives and means to ensure the achievement of environmental results. Policies are generally not aimed at achieving specific targets, rely on unreformed or poorly combined instruments and are often dominated by revenue-raising objectives. Environmental legislation is extensive but inconsistent and unenforceable. Compliance levels are very low – almost every on-site inspection discovers one or several violations of varying severity.

Pakistan being the signatory of various international treaties and conventions pertaining to environment are working to restructure organizations or bring reforms through policies to get better outcomes in the field of environmental

protection and combat climate change issue. However After of 18th amendment by the parliament, Khyber Pakhtunkhwa Provincial Government has enacted its own environmental law. The KP Environmental Protection Bill, 2014 having been passed by the Provincial Assembly of KP on 25th November 2014 and approved by the Governor of the province on 4th December 2014 as an Act of Legislature of Province.

The following rules/regulation/policies pertaining to environment are currently being practiced in KP-Province;

- KP Environmental Protection Act 2014:
- IEE & EIA Regulation 2000
- Biodegradable Rules 2016.
- Hospital Waste Management Rules drafted.
- Climate Change Policy of KP 2016:
- Forest Law/Forest Act of KP 2002:
- KP Province Wild life (protection, Preservation, Conservation & Management Act 2015:
- Wild life Force Rules 2017
- Wildlife Board Rules 2016
- Water User Association Ordinance WUA 1981
- Agriculture Pesticide ordinance 1971 amended in 1997
- Agriculture pesticides rules 1973
- KP Fertilizers Control Act 1999
- KP Fertilizers Control rules 2003
- KP Fertilizer Control Act 2019 (Under review)
- The Canal and Drainage Act, 1873

Each government department is trying their best implement respective rules and regulation across the province. However, there are certain loopholes as result of which the desired outcomes cannot be achieved up to the extent it should be. Most of the department is dealing with rules/regulations which are outdated and needs to be revised keeping in mind the prevailing environmental implications and challenges. Furthermore, the existing set of rules is not in line with the advance environmental information system. Therefore, all the regulations need to be reviewed following the current environmental challenges and progress made by the rest of the world in the field of environmental information system.

2.6. Conceptual Framework for KP-EIMS:

An EIMS is an information technology solution for collecting and tracking environmental data as part of an overall environmental management system. In case of KPK, The EIMS must be designed to achieve the given objectives;

i. To change individual and collective behavior, environmental management and implementation of environmental policies,
ii. Support Institution/Organization's decision-making process and development, monitoring and evaluation of the existing policies.

The KP based EIMS would be providing a platform for environmental data and information collected from multiple sectors working for environment in one way or another, such as (Environmental Protection Agency EPA, Agriculture department, irrigation department, wildlife, fisheries, forestry and energy department etc.).

The collected data would be aggregated and stored in an integrated data repository that can be queried using relevant search functions designed to help

interpret the information. It will not only include the information itself, but also the actors producing and collecting the information as well as user of the information.

The proposed system will help use and disseminate environmental data in support to assess various segments of environment in general and climate in particular. Furthermore; measuring economic effects of changing environmental conditions and developing effective policies to cope the economic challenges and improve overall environmental performance. Moreover; through it features the experts belong to various sectors across the country would be able to;

i. Lead and share their perspectives, strategies, and valuable suggestions to integrate environment into development and achieve better economic outcomes and reduce environmental disfigurations.
ii. They would monitor the prevailing performance of the system an anticipated action.
iii. The provincial based EIMS must rely on the data gathered from all authentic sources which includes the aforementioned public sector organizations, Academia, Research Institutions, and National & International Organizations working in the province for environment.

With the passage of time, as the system gets mature the scope and data providing organization's network may be extended. The data would later be used or translate into various indicators that would be useful for decision making process. With the idea to make the overall system flexible & adaptive to incorporate new data sources and formats, the EIMS system shall be equipped with the appropriate tools that characterize a dynamic data collection platform. In this regard effective

guidelines and Standard Operating Procedures (SOPs) needs to be developed to manage the production, collections, storage and dissemination of the data or information.

2.6.1 Proposed features and characteristics of the KP-Based EIMS:

The goal is to ensure collection and processing of data which are important for the environment, to actually establish a network which will ensure data transmission to everyone who has right to it, in line with the law. Therefore, to ensure a completed and effective EIMS in the province is necessary to define standards which can be implemented on different hardware and software platforms. Data which is to be exchanged must satisfy certain conditions such as: data has to be validated and controlled before transmission. The system has to have the option of connecting with other systems –options of connecting with other information systems such as with waste management information system, water information system, air pollution information system, GHG dataset, etc. Furthermore it has to allow easy connection with international systems as well. As a conclusion, it has to be a web services system enabling communication and data transfer between computer systems via the internet because the use of web-based services has become increasingly popular over the last few years in the field of public-service provision.

Additionally, the provincial based EIMS should follow the basic philosophy of the Shared Environmental Information System (SIES), developed by the European Environment Agency (EEA). The system basically encourages the modernization of data handling of Environmental Information System and a set of principles which underpin the decision-making process. The proposed EIS for the KP province should follow the given principles;

i. The system must be managed as closed as possible to the data source.
ii. The acquired data to be shared with different organizations for different purposes.
iii. The data/information must be readily available to support environmental reporting and other research-oriented activities.
iv. The information/data should be accessible to multiple users which includes; (Policy makers, researchers & public).
v. The data or information to be accessible to support comparison at the appropriate geographical scale and citizen participation.
vi. Support through common and free/open software standards.
vii. Devise a framework to ensure the security of all available data or information.

It can further be helpful if KP-EPA publishes sector wise reports regularly such as waste report, report on surface and groundwater quality, report on air emission etc. and more importantly these report shall be readily available on respective websites which can be accessed within no time. The KP-EPA should provide the data based on specific request from other government departments, ministries, municipalities', academia and other research & developmental organizations. The following tools can be adopted by EPA and other government departments for environmental data dissemination.

In order to achieve better performance from the propose EIMS, key public sector organization and environmental research institutions must work together to reach successful implementation of the aforementioned principles. The data feeding the system should be predominantly based on the monitoring which happens across the province. The environmental monitoring to be in line with the existing set of rules/regulations that KP government is practicing.

The KP-based EIMS conceptual framework should have the following key components:

Components	Responsible party
Determine the prevailing challenges regarding Data Generation, Collection, Storage & Dissemination	Planning & Development Department, KP-IT Board with the assistance from Environmental Protection Agency-KP, with diverse range of stakeholders from Academia & Development Sector etc.
Review/evaluate existing set of rules & regulation and determined areas to be improved with respect to EIMS	Every government department evaluate their existing rules/regulations being practice and identify key area which needs to be improved
Criteria/requirement for developing EIMS for KP	Each department should evaluate their existing practices, resources, expertise and suggest requirement which can help feed an EIMS system.
Integrate EIMS in KP-Digital Policy	Environmental Protection Agency, KP-IT Board and other key stakeholders.
Using EIMS to improved economic decision making process	Independent IT-Cell/PM&RU and all line government departments.
Setting up a performance management system to measure progress and assess impact of EIMS	Independent IT-Cell/PM&RU

3 Conclusion & Recommendations:

After conducting detail interviews with the experts from various government departments in KP, it has been concluded that prevailing set of rules and regulation can achieve the desired outcomes i.e. (environmental protection), however there is always a room for improvement. Most of the rules & regulation are too old, which needs to be revised keeping in mind the current environmental challenges/implications and progress made by the rest of the world in the field of environmental protection, economic uplift and advance database management system.

Additionally, it was also revealed that provincial government has already taken few initiatives regarding e-governance, such as introducing online file tracking system in the government machinery to expedite the file processing system and get rid of the manual filing. The scope of the file tracking system was supposed to be expanded with the passage of time. However due to lack of interest shown by the top management of each government department did not let the system to sustain for long and did not achieve the desired outcomes, so individual willingness needs to be addressed by creating enabling atmosphere within each department. Furthermore, introducing complex nature of system in the form of an EIMS into the current government machinery will not work efficiently until and unless the capacity of staff is built, network of human resources are expanded and adequate financial resources are allocated.

It is therefore recommended that a pilot scale or modular approach needs to be followed to initiate EIMS into public sector organization. A decentralized

information technology cells are to be established within each department. This has few advantages / merits such as;

i. The risk of systems failure is localized,
ii. The major problem can be easily identified and corrected before further implementation,
iii. Operating personal can be trained before system is installed within the organization/department,

Additionally, the pilot scale project will help identify loopholes, evaluate feasibility, time, cost, unforeseen problems and will improve the project design prior to performance of full scale implementation.

Similarly, a key step in development of the new and effective EIMS for KP province is to modernize the legal provision relating to environmental information. The legal act would regulate data management and data flow among different government organizations and academia/institutions. More concretely the legal act would regulate;

i. Type of data and respective institution to be delivered to KP-EPA as a central data institution.
ii. The manner, frequency, format and timing of data delivery.
iii. Define the rules of cooperation on data exchange and data flow.
iv. Define the responsible person (officials) as a contact or focal person for cooperation with the EPA.
v. Define the platforms, tools and other means to be used.
vi. Define roles and responsibilities and competencies for access to data bases and or components of EIS.

The proposed legal act will contribute to improve the EIMS, increase the effectiveness and usability. There are sector for which specific information needs to be developed, such sectors includes water sector, biodiversity and air etc. To resolve detailed structured of these systems and to allow data collection, data processing, data publishing and overall data flows, specific SOPs have to be developed. Such procedures would regulate but not limited to the following;

i. Water information system, which also has to integrate other sub-systems which include data from municipalities etc.
ii. Air emission information system, which has to be inter-connected with the sub-offices/stations across the province.
iii. Green house gas emission information system for which a variety of data comes from energy, transport, public health, agriculture etc, department.

The new legislation should clearly define the way all systems (de-centralized) have to be interlinked. Access of official persons in charge of maintenance and data entry, access and use by official personal and public access.

The EIMS for KP-Province should have additional operational units and staff such as;

i. **Data Management Units**: That would include data collection processing and storage.
ii. **Software (Data base developing) Unit:** This unit would include maintenance of existing database and developing new data sets which would respond to the permanently arising needs.
iii. Web developer and web maintenance unit.
iv. GIS Unit.

Moreover; Political will always play a major role in materializing important tasks/projects in the landscape of this country. For the purpose in hand, major political stakeholders such as Minster for Environment, Information etc. could play a vital role. Moreover, lessons learned from Pakistan Citizen Portal can be utilized for successful implementation of Environmental Information Management System in Khyber Pakhtunkhwa as well as the whole country

4 References

1. Asian Development Bank (2008). *Country environmental analysis.*
2. Avouris, N. M., & Page, B. (Eds.). (2013). *Environmental informatics: Methodology and applications of environmental information processing* (Vol. 6). Springer Science & Business Media.
3. Bahman, A. (1991). *Plan deputy and defense and Armed forces support Ministry plan:" The management information plan of Armed forces support Ministry plan*". The Report of Systems Management and Informatics. p. 7.
4. Eisenhardt, K. M., & Zbaracki, M. J. (1992). *Strategic decision making*. Strategic management journal, 13(S2), 17-37.
5. O'Rourke, D. (1995). *Economics, Environment, and Equity: Policy Integration during Development in Vietnam*. Berkeley Planning Journal, 10(1).
6. Paavola, J. (2007*). Institutions and environmental governance*: A re-conceptualization. Ecological economics, 63(1), 93-103.
7. Rizzoli, A. E., Athanasiadis, I. N., & Villa, F. (2007). *Delivering Environmental Knowledge*: a Semantic Approach. In EnviroInfo (1) (pp. 43-50).

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