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Generating Global
Environmental Benefits - GEB

REVIEW OF VARIOUS ENVIRONMENTAL INFORMATION MANAGEMENT SYSTEMS (EIMSs) AND BEST PRACTICES FOR PAKISTAN'S EIMS UNDER GEB PROJECT

A study carried out by GEB project that briefly reviewed the evolution and establishment of an Environmental Information Management System across the world (USA, Europe, China, India etc.) and derived key lessons for Pakistan

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

Generating Global
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CHAPTER 1 – INTRODUCTION

1.1 BACKGROUND

Generating Global Environmental Benefits (GEB) Project is funded by the UNDP/GEF. It is implemented by Ministry of Climate Change, Government of Pakistan. The Project Management Unit (PMU) of GEB Project is established in Islamabad.

1.2 OBJECTIVES OF GEB PROJECT

Objectives of the GEB Project are as under:

- To manage environmental information
- To employ the environmental information for improved decision making

1.3 EXPECTED OUTCOMES

The project envisages three outcomes given in the following:

- Regular availability of consistent and reliable environmental data
- Coordinated and robust Environmental Information Management Systems (EIMS)
- Enhanced commitment and capacity for sustainable development planning & legislation

1.4 AIMS OF GEB PROJECT

Aims of GEB Project are as follows:

- To remove barriers to EIMS
- To mainstream global environmental concerns into economic decision making

1.5 PURPOSE

1.5.1 Purpose of GEB Project is to review various EIMS for exploring Best Practices (BPs) for possible adoption in Pakistan.

CHAPTER 2 – IDENTIFYING AREAS OF IMPROVEMENT FOR AVAILABILITY OF CONSISTENT AND RELIABLE ENVIRONMENTAL DATA

2.1 HISTORICAL BACKGROUND

2.1.1 During the year 2007 UNDP launched a sub programme for establishment of Environmental Information Management System (EIMS) jointly with Ministry of Environment, Government of Pakistan (GOP) and Royal Netherland Embassy in Pakistan. The objectives of the sub programme were envisaged as under:

- To review and analyze the current situation of environmental data/information management system (EIMS) in Pakistan.
- To establish an appropriate institutional and technical framework for EIMS Pakistan.
- To develop sector specific and inter sectoral data base of environmental information in the country.
- To establish functional EIMS.
- To build and strengthen the capacities of key organizations involved in establishment and sustainable operation of EIMS.

2.1.2 Under the above mentioned sub-programme the GOP had launched three pronged strategy comprising the following components:

- Generation, rationalization, harmonization and integration of standardized data & information to support the production of the three documents.
- Incorporation of means to access and use of existing data derived from many different sources and disciplines into a rational system.
- Development and use of a core or critical data-set and indicators for use in the above documents.
- Use of indicators, assessment methodologies and tools to enhance capacities at the national and provincial/regional level arid where necessary, at the local level.

2.1.3 In the pursuit of above said strategy following documents had to be prepared and updated for the proposed EIMS:

- **Compendium of Environmental statistics**

  Compendium of Environmental Statistics was launched in 1998 with Asian Development Bank's Technical Assistance. It was revised in 2004 (GOP, 2005). Also 92 National Environmental Sustainable Core Indicators had been proposed (NEC Consultants, 2008).

- **Regional Environmental Profiles**

  Environmental profiles have been prepared by respective provincial governments.

- **State of Environment (SOE) Report**

  - **National Requirement of SOE Report**

    Besides the **Rio Declaration and Agenda 21**, Pakistan Environmental Protection Act 1997) under clause (6d) the functions of Federal EPA mentions that it will prepare and publish an annual National Environment Report on the state of the environment. While under clause (4f) the functions of Environmental Protection Council mentions that it will consider the National Environment Report and give appropriate directions thereon.

  - **Objective of SOE Report**

    The objectives of new SOE Report were envisaged as under:

    - ✓ To inform the public, Government and the concerned organizations about the state of environment in respect of both the prevailing human condition and the status of the natural resources in a consistent and comprehensive manner.
    - ✓ To provide information, on the basis of empirical evidence, on the various stresses placed on the human condition and the natural resource base.

- ✓ To assist in the process of informed planning by presenting information in a comprehensive and easily understandable framework that facilitates analyses of cause effect relationships and forms the basis for policies, strategies and action plans.
- ✓ To indicate, as far as practicable, gaps in the present state of knowledge and information, and the need for new information as well as for investment on research and development for improving the data base.
- ✓ To improve public understanding about the state of the environment in order to encourage a better informed public debate and to strengthen the role of major groups including business and industry.

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- ✓ To improve public understanding about the state of the environment in order to encourage a better informed public debate and to strengthen the role of major groups including business and industry.

- To promote precautionary approach in the implementation of environmental policies and programmes.

- **Launching**

  It was launched in 1987 by GOP titled Environmental Profile of Pakistan. Later it was revised in 2005 but not published.

2.2 IDENTIFYING AREAS OF IMPROVEMENT

2.2.1 General

- Liaison has been made with Federal Ministry of Climate Change and Provincial Environment Protection Agencies (EPAs) and Environment Protection Department (EPD) Punjab. It has been intimated that Federal Ministry of Environment and UNDP had conducted NEIMS Sub Programme in 2007. However, EIMS is yet to be framed.
- It is felt that the public & private sectors, industries, businesses, civil society, and NGOs are cognizant of EIMS significance and its application in sustainable development.

2.2.2 Flaws/Gaps in Existing System

- **Capacity Building**
  - Federal Ministry of climate change is equipped with PMU and other technical & administrative staff yet it needs more technical & financial capability to be fully functional.
  - The EPD and EPAs lack capacity to be effective in EIMS role.

- **Multiple Sources of Environmental Information**

  Environment is a subject of civil society, NGOs public & private, sectors and other global & national organisations in Pakistan. Therefore, they collect, compile, synthesis, process and analyse the data keeping in view own needs. This implies that till today the environmental data/information is not managed centrally.

- In absence of EIMS all sectoral development projects are neither professionally planned nor implemented on ground.

- On account of Devolution Scheme under 18th Amendment of Constitution, the environment has become provincial responsibility. The provinces have not given the required attention to this issue.

CHAPTER 3 –REVIEWING PROVINCIAL, NATIONAL, INTERNATIONAL & REGIONAL BEST PRACTICES OF EIMS AND POTENTIAL FOR INCORPORATION IN PAKISTAN'S EIMS

3.1 BASIC CONCEPT OF ENVIRONMENTAL INFORMATION AND ENVIRONMENTAL INFORMATION MANAGEMENT SYSTEMS (EIMSs)

For proper understanding of EIMS explanations of a few terms are given below:

3.1.1 Definitions

- **Environmental Information and Environmental Information Systems** play a major role in environmental decision making. This working paper is a review of the historical development and state-of-the-art of environmental information systems. It focuses on the creation, management and use of Environmental Information Systems (EISs) Muki Haklay, 1999.
- **EIMS** are a collection of contemporary technologies collectively used to allow a user to store, query, visualize and analyze historic and real time environment data.
- **Shared Environmental Information System (SEIS) Germany**

  Shared Environmental Information System (SEIS) was established to improve the collection, exchange and use of environmental data and information across Europe. SEIS aims to create an integrated, web-enabled, EU-wide Environmental Information System by simplifying and modernizing existing information systems and processes.

3.1.2 Setting up of EIMS

Setting up EIMS in 4 easy steps are given below:

- Choose which information modules is wanted to be integrated in EIS
- Choose a hardware server platform (NT or Macintosh) or have Ecotopia

- Host your EIS feed the information into the database, including data from remote locations, using a simple web browser
- Select from a number of report templates or create custom lay-outs (Source: Ecotopia Web Site)

3.1.3 Environmental Informatics

Environmental Informatics is a field of applied computer science that develops and uses the techniques of information processing for environmental protection, research, and engineering basic methodological issues and typical application system GIS, modeling software, environmental management systems, knowledge-based systems, and the visualization of complex environmental data. A sampling of topics: networking protocols and tools for the environmental science community, and adaptable architecture for river quality monitoring, and CRAMD a database for validation of models used in chemical risk assessment (Avouris and Page, 1995).

3.1.4 GIS Related Problems

EIMS and GIS are closely interlinked. The GIS Related Problems are mentioned in the following:

- **Lack of Base Mapping**

  The cost and availability of digital geographic information plays a crucial part in the feasibility and creation of EISs. This problem poses an obstacle in areas of the world where accurate base mapping is not available. A common situation in developing countries (Tveitdal, 1996) or in the creation of grass roots EISs (Pipes and Maguire, 1997).

- **Lack of Expertise**

  Efficient, productive and useful operation of GIS requires a fairly high level of knowledge and skills- ranging from basic knowledge in geomatics, to computer maintenance and programming. In the case of EIS, there is an added demand for knowledge in the specific domain- such as ecology or pollution control. In many cases these requirements make it fairly difficult to recruit and train adequate staff.

- **Integrity, Reliability and Accuracy**

  EIS models tend to rely on multiple data sources and the problem of error propagation in EIS models has been recognized and received attention by researchers

(Heuvelink, 1998). To reduce the errors in the output (which are then used to support a decision) the data sources must be reliable and complete. This, naturally, raises the cost of collecting the information and reinforces the need for metadata, as it serves as the main source for assessing the quality of the data set.

- **Weak Analytical Capabilities**

  In many environmental applications, there is a need to create and integrate sophisticated models. However, the current software products lack functionality and cannot keep up with the innovations in the field of environmental modeling. As a result, the EIS developer must programme the specific models with the software development tools that come with the GIS. This, of course, increase the total cost of the EIS even further (Joao and Fonseca, 1996).

3.1.5 Benefits of EIMS

EIMS provides a complete, largely automatic, fully integrated, state-of-the-art ICT solution for the environmental management: planning, assessment, compliance monitoring and impact assessment as well as emergency management for industrial enterprises or groups of co-located enterprises in industrial parks.

3.1.6 Characteristics of Good EIMS

Characteristics of Good EIMS are appended below:

- Allow for easy data input and import
- Be secure
- Support industry standard Electronic Data Deliverable (EDD) formats
- Provide a robust query interface which allows to query environmental data by location, parameter and date
- Allow for easy State and Federal MCL Comparison
- Have allowance for data validation and verification
- Graph and map with flexible options
- Allow for flexible report generation

- Allow for export to third party software
- Be intuitive to use
- It should meet national and provincial needs

(Modified from http://www.ess.co.at/EIMS/)

3.1.7 Desk Review

Relevant literature including documents were studied in detail. Some of them are given in References.

3.2 INTERNATIONAL BEST PRACTICES OF EIMS

Most of the countries of the world have made tremendous progress in EIMS field. Only a few instances are mentioned below:

3.2.1 Germany

- **The Shared Environmental Information System (SEIS)**
    - The SEIS was established to improve the collection, exchange and use of environmental data and information across Europe. SEIS aims to create an integrated, web-enabled, EU-wide environmental information system by simplifying and modernising existing information systems and processes.
    - SEIS helps, streamline and modernise their existing systems and processes and makes them web-enabled. It is a decentralised yet integrated system that improves the quality, availability, accessibility and understanding of environmental information.
- **Environmental Management Information Systems for Production and Recycling**

  Environmental management information systems (EIMS) represent an important contribution for the support of environmental protection by companies. In this contribution a special feature of EIMS will be focused on which supports the documentation and reduction of the considerable amounts of environmental damage caused by industrial production.

- **EIMS for Improving Reverse Logistics Decision-making**

  EIMS helps to improve decision-making processes in reverse logistics. We apply a design-science approach based on technical feasibility and business requirements. We identify domain-specific information requirements and information sources. Also we provide description of source system and depict their inter relation.

- **German Industry**

  EIMS provides a complete, largely automatic, fully integrated, state-of-the-art ICT solution for the environmental management planning, assessment, compliance monitoring and impact assessment as well as emergency management for industrial enterprises of groups of co-located enterprises in industrial parks or zones. (Source: http://www.ess.co.at/EIMS).

3.2.2 CASA PAPER 7 – FROM ENVIRONMENTAL INFORMATION SYSTEMS TO ENVIRONMENTAL INFORMATICS – EVOLUTION AND MEANING BY MUKI HALAY

- **EIS and UNEP / Earth Watch**

  INFOTERRA is probably the first EIS. The Earth Watch concept was on the UNEP agenda from its inception a mission to evaluate, monitor, research and exchange data and information about the global environment. As time went by the Global Environment Monitoring System (GEMS) unit became the pivotal body within UNEP. GEMS is in charge of collecting, validating, storing and systematising the data from various monitoring programmes at a global scale.

- The next major event in the UNEP EIS story is the Rio Conference 1992 and Agenda 21 (A21) EIS are first mentioned in chapter 12 of Agenda 21, which focuses on desertification.

- **Chapter 40 of Agenda 21 is dedicated to the role of information in sustainable development**

Article 40.1 In sustainable development, everyone is a user and provider of information considered in the broad sense. That includes data, information, appropriately packaged experience and knowledge. The need for information arises at all levels, from that of senior decision makers at the national and international levels to the grass-roots and individual levels. The following two programme areas need to be implemented to ensure that decisions are based increasingly on sound information:

- Bridging the data gap
- Improving information availability

- Relevant international organisations should develop practical recommendations for coordinated, harmonized collection and assessment of data at the national and international levels. National and international data and information centres should set up continuous and accurate data-collection systems and make use of geographic information systems, expert systems, models and a variety of other techniques for the assessment and analysis of data. These steps will be particularly relevant, as large quantities of data from satellite sources will need to be processed in the future. Developed countries and international organizations, as well as the private sector, should cooperate, in particular with developing countries, upon request, to facilitate their acquiring these technologies and this know how.

- **Sub-National EIS**

  Sub-National EIS can be found mainly in Western countries where a sub-national governance arrangement exists. In most cases, it is the environmental function within this governance that initiate and manage the EIS. Examples can be found in **Portugal (the Alentejo region), Switzerland (with GENIE-EIS for Geneva canton), Spain (Andalucia), the UK (Cornwall). The most prominent example for a set of sub-national EIS is in Germany- with the system of Umwelt informations systemen (UIS). Every German State (Lander) has a UIS**. These systems have been developed since the early

90s, and the environmental authority at the State Level urns it. The UIS is based on GIS, and contains information about various aspects of the environment. They are used to analyse and model the state of the environment and to manage the environmental resources of the state. The systems are mainly for the use of the environmental professional and researchers, but some are already developing a WWW interface with the aim to provide access to the general public.

- **EIS-Management Tool for Regional Projects**

  In many countries some geographical areas have earned a special importance in their environmental amenities. Due to their special virtues, it is common to find a concerted effort to manage and monitor them. In some cases these efforts have led to the creation of dedicated EIS for the region. As the jurisdiction over the region is usually divided between more than one authority, an environmental oriented body is assigned to create and run the system (the UNEP regional systems, such as BALLERINA, have the same roots: supra-national bodies who can overcome the juridical barriers). In the United States such systems exist in Cheaspeake Bay, the US-Mexico border region.

- **Municipal/Metropolitan EIS**

  The urban environment has its own set of environmental issues and authorities. Just like their colleagues in the regional and national environmental services, the municipal environmental professionals have created a range of information systems to manage and monitor the environment. Among the reviewed EIS, the municipal systems seem to be the ones that try to contact the wider public by providing environmental atlases.

- **Statistics Canada EIS**

  Statistics Canada made available its Environmental Information System to all interested users in June 1991. The system contains a wide variety of socio-economic data series, and provides the facility to combine this data with external environmental data.

- **GAIA**

Overall, GAIA aims to provide innovative tools and methods to promote the conservation and the sustainable use of natural resources. At the same time, and through the methodology used to address the first objective, it aims to integrate developing countries into the global information society to combine research skills established in developing countries institutions with their EU counterparts and to facilitate the growth of an information and communications area.

3.2.3 INDIA (ENVIS)

- **Environmental Information System (ENVIS)**

  It is a decentralized system of Centres mandated to develop a distributed network of subject-specific databases. With the association of the various State Governments/Union Territories Administrations in promoting the ENVIS network to cover a wide range of subjects. 28 ENVIS Centres are operating from State/UT Departments/Pollution Control Boards on State/ UT-wide status of environment and related issues.

- It has wide application in designing and monitoring environmental and other projects.

3.2.4 China

China's 2007 open government information regulations is widely considered as a milestone in the country's information policy history and is praised as a sunshine program. The Environmental Information Disclosure Decree was the first to operationalize these general regulations into a sectoral information disclosure system on environment.

3.2.5 Tanzania

- One of the important outputs is **increased capacity for collection**, management and utilization of environmental information. Geographic Information System (GIS) has been identified and accepted as an important tool is implementing an Environmental Management Information System (EIMS) for IRINGA Municipality.

- The design and development of the EIMS has been completed and EIMS is now being implemented in IRINGA. It consists of the EIMS LM a land management module, EIMS RV a revenue management module, and EIMS TM a thematic management module.
- Tanzania is using EIMS extensively in sustainable cities programme.

  Source:https://www.researchgate.net/publication/229003835_An_Environmental_Management_Information_System_EMIS_for_Iringa_Municipality_Tanzania_Implementation_Challenges

3.2.6 UK

Environmental Information Regulations 2004 (EIR)

- The Regulations are derived from European law. They implement the European Council Directive 2003/4/CE on public access to environmental information (the EC Directive) in the UK. The principle behind the law is that giving the public access to environmental information will encourage greater awareness of issues that affect the environment. Greater awareness helps increase public participation in decision-making; it makes public bodies more accountable and transparent and it builds public confidence and trust in them.
- The Environmental Information Regulations 2004 provide public access to environmental information held by public authorities.

  (Source: https://ico.org.uk/for-organisations/guide-to-the-environ-mental-information-regulations/what-are-the-eir/)

3.2.7 Sweden

Communicative Aspects of Environmental Management by Objective (MBO): Examples from the Swedish Context

MBO is an indigenous technique for integrating ecological concerns into national, political and administrative structures. Politicians determine environmental objectives and interim targets to be implemented and assessed by civil servants in national, regional and local contexts.

Source:**https //www.researchgate.net/publication/"7292319_communicative_aspects_of_environmental_management_by_objectives_examples_from"**

3.2.8 USA

- USA EPA has made extensive efforts for introduction of MEIS, GIS and remote sensing. The country is utilizing environmental information/data in sustainable development projects. Quiet often.
- **Information Systems Innovation for Environmental Sustainability**

  MIS Quarterly published in USA has selected a number of questions for research purpose as under:

  - **Research Methodology for Lifecycle Analysis**

    Lifecycle analysis and integrated assessment be applied to examine complex problems including information systems, organizations & natural environment.

  - **Environmental Data Sources and Matrics**

    It is used to assess impact of IS on natural environment.

  - Study of Beliefs About Environmental Sustainability
  - IS and Individual Sustainability Actions
  - It is used for developing systems that influence human actions about natural environment.
  - Association between IS and organizational and sustainability performance.
  - Association between IS and supply chain performance from an efficiency and environmental perspective.

- Firms optimally invest in industry IS platforms intended to reduce negative externalities associated with the natural environment.
- System approaches shed light on organizational and environmental outcomes that result from the use of IS for environmental sustainability.
- IS are systems that are included in business processes and these, in turn, are included in organizations, and the latter finally are included in their environment" (Mora et al. 2003, p.18)
- **Environmental Information Management Systems – Overview**
  EIMS aims to include processes, software & hardware, communication, decision making, reporting, record keeping and assessment within EMS. It deals with regulatory, private and client stakeholders.
  Source: http://www.edm-usa.com/resources/whitepapers/ImprovingYourEMIS.php
- Environmental Information Systems
  Source: https://www.hatfieldgroup.com/services/information-systems/
- Environmental Information Management System
  Source: https://eims.bcogc.ca/eims/wildlife

3.2.9 Turkey

- Integrated Environmental Information System (EÇBS), Motat And Guide On Waste Electric And Electronic Equipment (WEEE) Management
  Source:file:///C:/Users/Attar%20Telecom/Downloads/Documents/Electronic_Data_Entry_Guide_Integrated_Environmental_tInformat%C4%B1on_Syste.pdf
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Source: http://www.kmo.com.tr/en/29471/Development-and-Maintenance-of-Environmental-Information-System

- Turkey is linked with EU in respect of EIMS. Accordingly it has completed a number of EIMS projects. The infrastructure and main building blocks of the Environmental Information System have been implemented.

CHAPTER 4 – PAKISTAN'S PROSPECTIVE EIMS BASED ON AVAILABLE BEST PRACTICES

4.1 Guiding Principles

While framing EIMS the following guiding principles should be kept in view:

4.1.1 Relevant features of national public policies including environmental policy should be incorporated in the EIMS.

4.1.2 The strategic and tactical ecological scenarios should be included.

4.1.3 Level of current environmental, GIS, remote sensing, space science etc should be in sight while preparing EIMS.

4.1.4 Views of all stakeholders should be incorporated in EIMS.

4.1.5 International cooperation from organization like UNESCO and NASA should be sought.

4.1.6 Comparative environmental and economic indicators should be followed in the EIMS.

4.1.7 Public disclosure system should be rapid and efficient.

4.1.8 Provinces must play active role in framing EIMS. They need to incorporate their respective environmental and economic problems.

4.2 Preparation of EIMS

4.2.1 Immediate actions should be taken to formulate EIMS on emergency basis. If national and provincial legislation are required to undertake this task, it should be done wholeheartedly. A committee of specialists should be formed under the supervision of The PMU-GEB Project for preparing the draft EIMS.

4.2.2 Once draft EIMS is prepared it should be widely circulated so that every stakeholder may share its views.

4.2.3 Local expertise is competent to undertake the job. However, some technical help may be sought from UN and other agencies.

CHAPTER 5 – APPROACH AND METHODOLOGY

5.1 OUTLINE APPROACH

To conduct the subject study an open, a participatory and pragmatic approach had been adopted comprising the following cardinal points:

5.1.1 Regular sharing of information/data with The PMU-GEB Project and apprising them with the quality & progress of assignment.

5.1.2 Limited exchange of views with following stakeholders and incorporating their concerns in the Draft Final Report:

- Ministry of Climate Change, Government of Pakistan
- Environment Protection Department, Government of Punjab
- Environment Protection Agency, Government of Punjab
- Environment Protection Agency, Government of Balochistan
- Environment Protection Agency, Government of Sindh
- Environment Protection Agency, Government of KPK
- Environment Protection Agency, Government of AJ&K
- Environment Protection Agency, Government of Gilgit & Baltistan
- Civil Society and NGOS.

5.1.3 Everybody realizes significance of NEIMS and want it to be completed the earliest possible.

5.2 METHODOLOGY

Comprehensive methodology had been formulated as under:

5.2.1 Collection of Data / Information

Data/Information is to be obtained through desk work, review of available reports & literature, meetings with stakeholders and remote sensing & GIS references.

- **National**

  Relevant national and provincial departments & agencies to be contacted for procurement of their

respective input on Environmental Information Management System (EIMS).

- **Global**

  Environmental Information Management System (EIMS) of various countries to be collected from internet and other sources for their in depth study. The possible countries are USA, UK, India, Germany, Tanzania, Turkey and others.

5.2.2 Data Synthesis and Comparison

The raw collected data / information to be computerized, analyzed and integrated for further studies. Also comparison between various EIMS will be carried out for future adopting the best practices in Pakistan.

5.2.3 Preparation of Inception Report

Inception report had been prepared as per requirement of TOR.

5.3 Analysis

Analysis of national and global Environmental Information Management System (EIMS) has been done in detail. Gaps noted and best practices to be suggested for incorporation in the EIMS document.

5.4 Comparison

After having done analysis of individual system a detailed comparison to be made among all of them the outcomes will lead to suggesting the best practices in the context of Pakistan. It is suggested that an International Conference on the subject is arranged in Islamabad in the year 2019. This will help the local experts to learn from the leading EIMS specialists of the world.

CHAPTER 6– CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSION

After having carried out analysis and comparison of various Environmental information Management Systems (EIMS) at national & global levels following conclusions are made:

- The world at large is making use of EIMS extensively in the multi-sectoral planning and policy making. Pakistan lags behind.
- It is the most opportune time that Pakistan embarks upon the national venture of designing EIMS for national and provincial usage with the technical and financial support of UNDP & GEF.

6.2 RECOMMENDATIONS

In view of various EIMS in vogue in the world viable recommendations are made for adopting the most comprehensive system in Pakistan:

- Establish Environmental Profile, Strategic Social & Environmental Assessment (SESEA) and Environmental Atlas of Pakistan including those of provinces.
- **Revision of Environmental Indicators**

  Environmental Indicators already mentioned above need to be revised and updated commensurate scenario.

- **Establishment of Socio-economic-cultural-political Indicators**

  Since the country enjoys multi-social, cultural and economic society therefore these indicators need to be established and dovetailed in planning.

- Federal Ministry of Planning, Development & Reform is responsible to make policies, plans and action strategies for the whole of Pakistan. This necessitates their active involvement in the entire process.
- Similar to Census Organization of Pakistan it is felt that environmental statistics should be collected centrally.
- With a view to obtain input from stakeholders consultative workshops should be held in all provinces.
- There is need of including EIMS as a special clause in Pakistan Environment Protection Act, 1997.

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