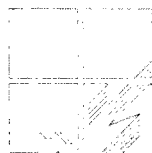# SACEP ENVIRONMENTAL NATURAL RESOURCES INFORMATION SYSTEM (SENRIC)

COLOMBO

CAPACITY BUILDING & INFORMATION COLLECTION

AND DISSEMINATION AT NATIONAL LEVEL

A SNAP REVIEW

DECEMBER, 1994

JPS ASSOCIATES
MANAGEMENT CONSULTANTS

NEW DELHI, INDIA

SACEP ENVIRONMENTAL NATURAL RESOURCES INFORMATION SYSTEM (SENRIC)

COLOMBO

CAPACITY BUILDING & INFORMATION COLLECTION

AND DISSEMINATION AT NATIONAL LEVEL

A SNAP REVIEW

DECEMBER, 1994

NEW DELHI, INDIA

INDEX

INTRODUCTION

SACEP is setting up an information centre for dissemination of environmental information in the South Asian region called SACEP Environmental Natural Resources Information Centre (SENRIC). This will be set up with a Geographical Information System (GIS) facility and upgraded with an Image Processing System at a later stage.

SENRIC Head Office is located at Colombo. SENRIC will also build up nodal centres in the headquarters of the Member Countries in a networking fashion.

SENRIC Activity :

UNEP has established RENRIC at Bankok to bring about inter-country co-operation in the Countries in the Asia Pacific region. The primary mission of RENRIC is to facilitate the provision and exchange of environmental information to support the decision making and action towards sustainable development. RENRIC would be involved in Capacity Building, Environmental Sensing and Catalyzing Government response.

RENRIC will build its collaborative process primarlily based on the following blocks :-

* Build on existing institutional base on a complementary and non-competitive basis.

* Integrate scattered institutions, experts and data to avoid duplication of efforts.

* Build in Country capability for human resource development and institution building.

* Build national / regional networked and decentralized
  environmental resource information systems.

SENRIC mandate is to build up Nodal Centres in the headquarters of the Member Countries in a networking fashion. Through this programme, the committed money for the project will flow to the Member Countries for the above activities to be undertaken.

SENRIC Priority Objectives

1. **Capacity Building** will involve institutional assistance as well as technology transfer, collaborative financing, training and information dissemination.

   a) Increase capacities of Governments utilizing modern information technologies and tools to integrate bio-physical and socio-economic data.

   b) Establish sub-national, national, sub-regional, and regional environment information network.

   c) Facilitate to bring together bilateral, multilateral and other agencies on a common collaborative programme to support environmental institutions with necessary mechanisms to transfer technology for the establishment of decision support systems.

   d) Training.

2. **Catalyze Government Response :** Assist UNEP to bring Governments together to develop policies, programmes, or to negotiate agreements towards sustainable development.

## SENRIC Programme Implementation Strategy in Capacity Building :

SENRIC would contact the governmental bodies to develop a directory of environmental institutions and consequently make proposals to UNEP for capacity building exercise.

Initially an Environmental Information System (EIS) at the Environment Ministry, followed by GIS facilities for other departments will be provided from the inventory directory exercise estimates, through assistance from UNEP / GRID.

EIS Establishment for the Countries :

An EIS will be established within the Ministry of Environment to facilitate the decision making process within the Government. It is further envisaged that SENRIC would initiate bilateral / multilateral projects to aid the Government in dealing with the environmental issues, in association with the other agencies working in similar activities.

The regional country nodes are expected to assess the existing capacities of the Country's technology and the trained manpower, identify institutions to be trained on GIS technology and further strengthen the National Information Centres by providing GIS plateforms through ADB / UNEP grant, as specified in the MOU.
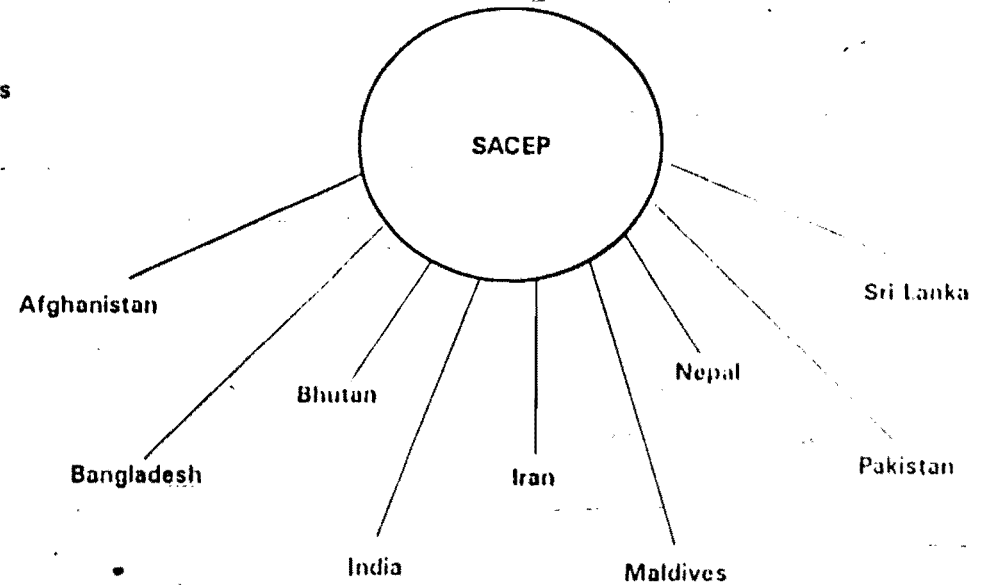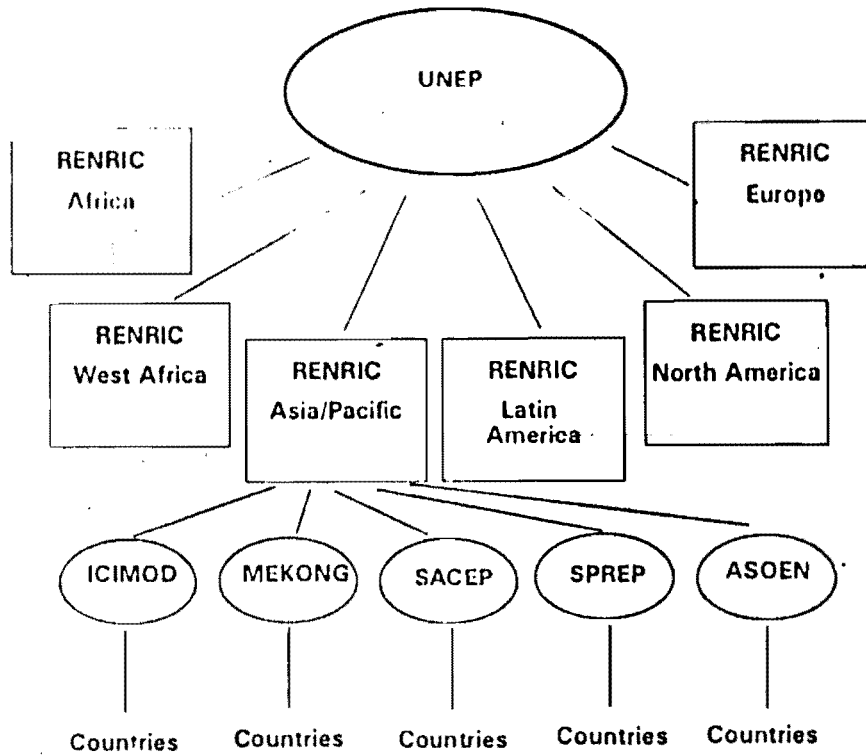
CAPACITY BUILDING & INFORMATION COLLECTION & DISSEMINATION AT NATIONAL LEVEL

Environmental monitoring and research is becoming necessary, rather vital, to support decisions for promoting sustainable development in a region.

In the broad sector of development planning and decision making, environmental monitoring has the following key operating arenas:

* Environmental monitoring and prediction for drought, flood and other natural and technological hazard management.

* Environmental research for human settlement and infrastructure planning.

Environmental monitoring and prediction is a necessary prerequisite to developing a national or state level development strategy. Decisions for formulating policies on environmental management and development of a region (which includes sustainable land use, responsible exploitation of natural resources and improvement of degraded environment), drought and flood management etc., can only be taken in the light of information on current problem areas, anticipated environmental problems (like adverse effects of rapid industrialization, urbanization and the energy crises), long term environmental impacts of various types of large and medium scale projects, land use related issues, the natural environment of the region (geomorphology, soils, water, ecosystem), socio-economic factors and the existing legislature - administrative framework.

Planning the location of human settlements and infrastructure development too presupposes the gathering and analysis of data on environmentally sensitive areas (classify areas as being subject to desertification, being biologically valuable tropical forests, being wetlands, being areas of outstanding biological diversity, or of particular cultural value, or erosion prone areas) where people cannot be settled. Collection and analysis of information on natural environment (climate, geomorphology, soils, water, ecosystem) socio-economic factors (population density distribution, existing level of infrastructure and urban development, description and type of industry, agriculture and land use pattern) will assist urban planners to formulate decisions and strategies on location and extent of coverage of urban infrastructure facilities like water supply, sewerage street lighting, roads and bridges etc.

This section thus illustrates the imperativeness of developing a mechanism to collect, collate and analyze data pertaining to environmental conditions prevailing in a region, to enable planners to take decisions for sustainable development of the region.

In India, Government departments in general and some non governmental organizations generate considerable amount of data in order to assess situations prevailing in their area of operation or for monitoring and control purposes. This data, which most often possesses spatial as well as aspatial connotations, is characterized by diversity and multiple uses. Due to different sources and organizations involved in data collection and storage, problems of consistency and reliability

often arise. Further, the information is either too cumbersome to handle or not presented in a user friendly manner to enable a decision-maker to readily base his decisions on such data. Consequently, this sector wise approach may lead to an overestimation of the total available natural resources. An integrated analysis of the available data seems a prerequisite for sustainable development as it confronts the various users with the limitations of the resources. An integrated analysis is possible by adopting the approach of Geographic Information System (GIS). A GIS will serve as a good monitoring tool, in its most limited sense and a decision support aid enabling insights into alternative scenarios, in its more generic sense.

The use of a geo-information system for satisfying a given need is called an application. Applications of GIS. are increasing rapidly as city, regional and environmental planners, resource managers and the scientific community in India are becoming aware of the full potential of these systems. GIS has applications for developmental planning at different hierarchical units e.g. state, district and sub-district levels.

Zilla Parishads in various Indian states function as decentralized arms of the Government. They are the lower most levels for which financial resources and allocation are made by the Government. They also act as the direct executing agency for certain activities with defined targets and budgets. This being so, a correlative and comparative presentation of natural and socio-economic resources available for the constituents of the districts can be spatial or aspatial

in nature. Accordingly, the data sources which would be tapped include departmental records, census books, topo sheets, remotely sensed data products, research reports, plan documents, etc. One of the major efforts would be to link up the spatial and aspatial elements of the database, which would involve the installation of the core GIS software and an appropriate configuration of compatible hardware at the State and District level offices.

At the National Level focus will have to be given to the following aspects :

a)   INSTITUTIONAL:

This component would include building up linkages between various Departments in order to evolve data sharing mechanisms and sustenance of the database through regular use and updation.

b)   MANPOWER DEVELOPMENT:

This component would include training of various prospective users to orient them in the concept of GIS and over a period of time adapt themselves to use the increased capabilities offered by such a system.

c)   MANAGERIAL:

This would include building management systems for seeing the SENRIC initiatives through, inclusive of planning, monitoring, control and documentation.

MILESTONES / ACTIVITIES

This phase forms the foundation for formulating the draft plan of operations for all states of India. In this phase, the GIS for pilot districts in identified states will be developed and implemented. On the basis of evaluation of achievements and shortcomings of this phase, the plan of operations will be suitably modified for the remaining states to ensure that the SENRIC project objectives are achieved. The following activities will be undertaken relating to the pilot districts.

i)   Data collection on attribute parameters.

ii)   Validate the same.

iii)   Load them on to the system to result in an attribute database.

iv)   Prepare thematic maps based on remote sensing and ground based information.

v)   Transform these maps on to digital database.

vi)   Link up (v) and (iii) in order to result in a district GIS.

Data Collection and Validation of Data :

Nodal agency in India will assist in the exercise of data collection and validation. As a chain of operations for collecting / generating and analyzing spatially referenced data, GIS will have the following stages.

o   Identification of users' information needs, data collection and validation.

o   Pre processing and entering of data into the GIS.

o   Analysis of the data using GIS capabilities.

a) **Identification of users' information needs**

Data collection and validation is the process of identifying users' information needs and gathering data required for specific application. This is the most fundamental step in developing a database for a geo-information system. Infact, getting data is one of the greatest operational problems and accounts for a large portion of the time and costs involved in this field specially in India.

A GIS is of no use to anyone until the relevant data have been identified and authenticated. Therefore, sufficient time and effort needs to be expended on ensuring that the various datasets are not only relevant, but also reliable.

Based on interactions, the nodal agency will identify potential information sources, understand the operating structures of these sources and ownership and access routes governing transfer of data. In the light of this understanding, effective linkages for ensuring functional data flows shall be evolved.

Nodal agency in collaboration with various participating institutions will finalize the formats for data collection. At this juncture appropriate quality control criteria for monitoring data collection will be evolved.

b) **Data Collection and validation:**

Nodal agency and its collaborating institutions will acquire data in a variety of forms and from various sources. This data which can either be in a spatial or a tabular format obtained from diverse data sources shall get

checked on the field through limited field surveys and ground truth exercises. There will be times and circumstances where the existing information base may not be relevant or sufficiently current. Data sets whose validity is not known can also be encountered. In such situations data sets would need reconsideration on the basis of either direct field observations or inferences drawn logically from related events. This could be done by sampling and statistical experts available with research organizations like Institute of Social and Economic Change, Bangalore, Indian Statistical Institute and the Department of Science and Technology, Delhi.

For data collection in identified states / districts some of the agencies to be visited for assessing data needs/requirements are:

1. Zilla Parishad.

2. Department of Mines and Geology.

3. Department of Horticulture.

4. District Statistical Officer.

5. Watershed Development Programme Officer.

6. Department of Agriculture-Soil Conservation.

7. Department of Environment and Forests.

8. Water supply department

9. Irrigation department

10. Wasteland Development Board

11. District Administrator

12. Electricity Board

13. Planning commission

14. Relevant NGO's

In addition, the data records on these districts available with the National Informatics Centre, (NIC) and other agencies at the state level should also be studied.

The value added uses of the information collected can only be realised if it is possible to cross relate and integrate diverse datasets, which implies the need for close and effective cooperation both between separate departments/units within local bodies and between bodies i.e. success of GIS will depend on information synergy.

Data integration is perhaps the corner stone of a Geographic Information System. The ability to store, analyze data of different types together, is what makes the GIS different from the usual computer mapping system. Following data collection and validation, expert institutions like IIT, Bombay, as also the core staff at the secretariat of Department of Science and Technology (DST), Delhi can assist the nodal agency to unify the diverse data sets.

This would involve pre-processing procedures to convert/generate data sets into a form that is compatible with the formats.

Data collection activities will center around acquiring data under the following broad categories.

o Natural resource database

o Socio-Economic database

o Institutional resource database

Detailed parameters for each database are given below (data will be collected at state, district, block panchayat/village level).

PROPOSED SENRIC NATURAL RESOURCES / ENVIRONMENT DATABASE

Area Map with geographic details and brief descriptions

Geomorphological		Slope, spot elevations, erosion type, drainage density, drainage frequency, land forms.
Geology	-	Characteristics of rocks, stability, mineral resources, and potential mining areas.
Soil	-	Soil type and texture, colour, thickness, parentage, suitability, erosion sensitivity and salinization.
Water	-	Source (perennial/non perennial), Chemical contents, depth of water level, ph value ground water level. Quality, quantity, water management, and hydro technical projects.
Meteorology	-	Rainfall (mm/year), temperature, relative humidity wind features. Droughts, growing seasons and climate diagram.
Forest	-	Territorial status, canopy density, geographical distribution.
Wildlife	-	Species, status, habitat, migration habits, source of information. Flora, Fauna, threatened species, vegetation.
Ecosystems	-	Cultivated, wasteland, forest, permanent pasture land, settlement, Ecological/landscape survey, regional, national and international importance of ecosystems, pest areas, maps of reserves and national parks with brief description of importance.
Wateruse	-	Ratio of ground water to surface water, ratio of agricultural use/ industrial use/urban use.
Landuse/problems	-	Systems, trends, capacity, importance of the ecosystems to man, Land degradation, conflicts of interests (livestock vs arable farming)/trends, pests, pesticides.

Irrigation   -   Major and minor irrigation projects.

                -    Conclusions

SOCIO-ECONOMIC DATA BASE - HUMAN FACTOR

Demography   -   Population, number of cities (Pop. over 1 million), population density (Urban/rural) ratio (men/women, growth rate, ratio urban/rural population, poverty ratio % below poverty line), per capita income, backward class and scheduled tribes, literacy rates, % Hindu, Muslims Christians Others, growth with trends, migration map of human settlements, infrastructure, proprietary rights.

Occupational   -   Workforce wages, income per family,
Pattern   men/women headed households (urban / rural), ratio of employment in industrial / agricultural / services, seasonal fluctuations in employment, rate of unemployment.

Land holding/   -   agriculture land per household, (ha)
Livestock   livestock per household.
Percentage of rural landless people.
Land distribution (GINI coefficient).

Significant   -   donor/state/central financed projects
Development   (number, period and investments) on
Activities   Irrigation and forestry.

Education   -   Years of education (women and men), primary schools (net enrollment rate) high schools (net enrollment rate) universities, professional training institutes. education expenditure as % of GDP, % of population voting.

Health   -   Hospitals, primary health care Centres, family planning programmes, life expectancy (women and men), morbidity pattern (e.g. waterborne diseases, accidents, cancer), infant mortality [children under 1 year (per thousand), (children under 5 years (per thousand)], veterinary hospitals, health expenditure as % of GDP, maternal deaths (number)

Communication/ Transport	-	Post office, telephones, bus services, trains, roads, radios.
General Amenities	-	Fair price shops, medical stores, Fertilizer depots, community centres,
Electricity/ Drinking Water	-	Power generation ratio hydro/fossil fuel, electricity supply, electricity use ratio industry/urban/agriculture, access to safe drinking water % (urban/rural) access to sanitation facilities % (urban/rural), % of households with electricity, average distance per household to water supply, ratio piped supply/open wells/handpumps, water-tariffs for standpost/house-connection, revenue collection, water supply/ electricity supply per year.
Institutional factors	-	Legislation, administrative framework, institutions and services, NGO, Local management
Social/cultural pattern	-	food preparation, biomass use for food preparation, average marriage age (women and men), individual latrines (% of population), communal latrines (% of population), number of municipal waste water treatment plants. per capita food consumption (cal pppd), height for age, weight for age, birth-weight of new born babies.
Cropping Pattern	-	ratio high yielding/local varieties, ratio irrigated/dry land, ratio food production/cash crops, fertilizer and pesticides use in kg/ha/year, percentage ratio of ground water/ surface water for irrigation.
Industrial	-	four main industrial activities (type, number of workforce, financial output), industrial waste water treatment plants, solid waste disposal sites.

The various levels at which data will be collected for this database is enumerated below.

DATA ELEMENTS	RESOLUTION

Socio-Economic Indicators

Demography

- Population	Village
- Population Density	Village
- Ratio Man/Woman	Village
- Growth Rate	Village
- Ratio Urban/rural	Taluka
- Backward Class and Scheduled Tribes	Village

OCCUPATIONAL PATTERN

- Work force wages	District
- Income per family	District
- Women /men headed households	District
- Employment Ratio - Industrial/Agricultural/Services	District
- Seasonal fluctuation in employment	District
- Rate of unemployment	District

LAND HOLDING/LIVESTOCK

- Agricultural Land Per household (ha)	Taluka
- Livestock per household	Taluka
- Percentage of rural landless persons	District

DEVELOPMENT OF RURAL LANDLESS PERSONS

Donor/State/Central financed projects
(Information on Number of projects,
duration and investment).

- Drinking Water Supply	Taluka/ Town
- Irrigation	Sub-basin
- Forestry	Taluka

EDUCATION

Primary schools (net enrollment rate)	District
High Schools (net enrollment rate)	District
Colleges/Universities	District
Professional Training Institutes	District

Health:

- Hospitals	Taluka
- Primary Health Centres	Taluka
- Family Planning Programme/Centre	Taluka

Communication/Transport

- Post Office	District
- Telephones	District
- Roads	District
- Bus Services	District
- Train	District
- Air	District
- Radio	District
- Television	District

General Amenities :

- Fair Price Shops	Taluka
- Medical Stores	Taluka
- Fertilizer Depots	Taluka
- Community Centres	Taluka
- Libraries	Taluka

Electricity and Drinking Water:

- Power generation	District
- Ratio-Hydro Fossil/fuel	District

- Electricity use ratio
  Industries/Urban/Ari.   District

- Average distance per household to
  water supply   District

- Ratio-piped supply/open wells/
  handpumps   District

- Water tariff for standpost
  water connection   District

- Revenue Collection Water Supply/
  Electricity Supply   District

Social/Cultural Pattern:

- Food Preparation   District

- Use of Biomass   District

- Average Marriage Age (Men/Women)   District

- Individual Latrines
  (% of Population)   District

- Communal Latrines
  (% of.Population)   District

- No. of Municipal waste
  water treatment plans   District

Cropping Pattern:

- Ratio high yielding/
  Local varieties   District

- .Ratio-Irrigated Dry land   District

- Ratio-Food Products/Cash crops   District

- Use of Fertilizer and Pesticides in
  kg. per ha.'/per year   District

- Ratio-Financial output/input in
  Rs. Per ha./per year   District

Industrial:

- Four Main Industrial activities   District

- Type   District

- Number of workforce   District

- Financial Output   District
- Industrial waste water treatment plans   District
- Solid Waste disposal sites   District

INSTITUTIONAL DATA BASE

- addresses of different departments like irrigation, water supply, pollution control board, environment and forest planning, groundwater, electricity board, district collectors and relevant NGO's.

  This data will be acquired at the following levels.

Institutional Indicators

    Addresses

- Irrigation Dept.   District
- Water Supply-Department   District
- State Pollution Control Board   District
- Environment and Forest Dept.   District
- Planning Body   District
- Ground Water Board   District
- Electricity Board   District
- District Administrator   District
- Relevant NGOs   District

In order to collect data and create the aforementioned database, Nodal agency will assist in interacting with the following agencies/departments at the National and State level.

NATIONAL

i)   All India Soil and Land Use Survey.

ii)   India Meteorological Department.

iii)   National Bureau of Soil Survey and Land Use
       Planning.

iv)   Central Ground Water Board.

v)   Forest Survey of India.

vi)   Survey of India.

vii)   National Atlas and Thematic Mapping Organisation.

STATE

i)   Agriculture Department

ii)   Dryland Development Board

iii)   Economics and Statistics Directorate

iv)   Education Department

v)   Electricity Board

vi)   Employment and Training Department

vii)   Forest Department

viii) Health Department

ix)   Urban Water Supply and Drainage Board

x)   State Remote Sensing Technology Utilisation
       Centre.

xi)   Mines and Geology Department

xii)   Public Health Engineering

xiii) Minor irrigation Department

xiv)   Public Works Department

xv)   Rural Development and Panchayat Raj Department

xvi)   State Pollution Control Board

xvii) Water Supply and Sewerage Department

xviii) Zila Parishad of all districts.

ACADEMIC INSTITUTIONS

i)   State Universities.

ii)   Indian Institute of Science.

iii) Institutes of Management.

iv)   Institutes for Social and Economic Change.

v)   Other premier research institutions.

The list of data -elements under the three databases is only indicative in nature. The details may vary to account for location - specific requirements. An attempt will have to be made to reflect the felt-needs of the end users of the data while finalizing the list of data elements.

After collecting information from various sources like remote sensing, field surveys, libraries, archives, repositories, the IIT, Bombay, Department of Science and Technology (Operating Agency) will undertake brain storming sessions to link the graphical/digital data with the textual/attribute database which will then be made compatible for storage in the computer system on a spatial mode.

The software package will generate computer compatible spatial databases of natural resources as well as collateral data on socio-agro-economic parameters and is based on spatial planning at different area/administrative levels i.e. district, block, panchayat level.

While developing and institutionalizing the GIS package, the Nodal agency will ensure:

i)   Information needs of all management levels and parts of the organisation are met: in this regard, the key groups with specific and distinctive information needs are:

-    senior management and strategic planners

-    service managers and functional planners

-    service deliverers

-    Elected representatives

-    Issue based or community based special interest groups.

-    General Public

-    Department of Science and Technology New Delhi, and state government departments.

(ii) The system designed will be able to provide each part of an organisation with the relevant information required, when it is required, while avoiding both information overload and information starvation.

(iii) The system should be integrated, interactive and networked to allow mobility of data between sources and users.

(iv) The system should be able to provide information on a small area basis but also have the flexibility to produce information about the whole range of spatial units which are of interest to an organisation.

(v) The system should be capable of holding past and current information to allow time series analysis.

Under the GIS, data on natural resources, demography, agro-economy, socio-economy and infrastructural facilities will form the CORE DATABASE, while problem specific data particular to an area will constitute SECTORIAL DATABASE.

INSTITUTIONAL SET UP

The design and development of the proposed geo-information system for an environmental cum socio-economic profile of India is being undertaken by SECEP. The nodal agency for overall coordination will be ENVIS under the Ministry of Environment & Forest, Government of India. We recommend that the Department of Science and Technology, Government of India, New Delhi should act the operating agency in view of this past experience in GIS and the infrastructure and equipment available with them. Also participating in the programme should be state government bodies, local district level bodies, NGO's, IIT Bombay, and consultants.

Institutional strengths and roles and responsibilities of GIS operating agency

A profile of Department of Science and Technology (DST) is given below evaluating its institutional strengths and role in implementing the project.

Department of Science & Technology (DST)

The Ministry of Science and Technology consists of three departments, viz, Department of Science and Technology (DST), Department of Scientific and Industrial Research (DSIR) and Department of Biotechnology (DBT).

The Department of Science and Technology (DST) was setup on 3rd May, 1971 to formulate policy statements and guidelines on science and technology, follow through their implementation and promote new areas. DST is also expected to undertake coordination of new areas of science and technology, in which a number of institutions and departments have interests and capabilities, matters commonly affecting scientific and technological institutions and all other measures needed for the promotion of science and technology and their application to the development and security of the nation. (DST) is divided into 15 subject specific scientific divisions and operates an annual budget of around Rs. 3,000 million.

Roles and Responsibilities of Department of Science and Technolgy (DST)

Department of Science and Technology (DST) as operating agency will be the principal coordinating and technical agency for this project. It will interface between the implementing agency at the state level and the SENRIC office at Columbo through ENVIS in the Ministry of Environment, Government of India. Its specific roles and responsibilities would include establishment of linkages with the national agencies like National Informatic Centre and Department of Space and to get suitable inputs from (NIC) and (NNRMS) programmes.

SENRIC - GIS

PROPOSED SYSTEM FOR MICROLEVEL PLANNING IN INDIA

	COLLECTION PROCESSING ANALYSIS	USER ORIENTED RETRIEVALS

APPLICATION MODELLING

INPUTS ·······················▶ PROCESSING STAGES ··········▶ OUTPUTS

AGENCIES ◀—— NODAL AGENCY OPERATING AGENCY ——▶ USERS

```
                        ┌─────────────┐
                        │   RENRIC    │
                        └─────────────┘
                               ▲
                        ┌─────────────┐
                        │   SENRIC    │
                        └─────────────┘
                               ▲
                        ┌─────────────┐
      ┌────────────────▶│  MIS EXPERT │
      │                 └─────────────┘
      │                        │
      │                        ▼
      │    ┌──────────────────────────────────┐    ┌──────────────────────┐
      │    │            I N D I A             │    │  CONDUCT VALIDITY     │
      │    │                                  │    │  CHECKS AT EACH POINT │
      │    │  NODAL AGENCY FOR DISSEMINATION  │───▶│  WITH THE ASSISTANCE  │
      │    │         OF INFORMATION           │    │  OF SENRIC CONSULTANTS│
      │    │             ENVIS                │    └──────────────────────┘
      │    │     MINISTRY OF ENVIRONMENT      │
      │    │       GOVERNMENT OF INDIA        │
      │    └──────────────────────────────────┘
      │                        ▲
      │    ┌──────────────────────────────────┐    ┌──────────────────────┐
      │    │        OPERATING AGENCY          │    │  INTERACT WITH NIC &  │
      │    │   DEPARTMENT OF SCIENCE AND      │───▶│  STATE DEPARTMENTS OF │
      │    │          TECHNOLOGY              │    │  SCIENCE & TECHNOLOGY │
      │    │       GOVERNMENT OF INDIA        │    └──────────────────────┘
      │    └──────────────────────────────────┘
      ▲                        ▲
      │    ┌──────────────────────────────────┐
      │    │      NATIONAL INSTITUTIONS :      │
      │    │      1.                          │
      │    │      2.                          │
      │    │      3.                          │
      │    └──────────────────────────────────┘
      ▲                        ▲                        ┌──────────────────────┐
      │    ┌──────────────────────────────────┐         │  INTERACT WITH NGO's  │
      │    │        STATE INSTITUTIONS.        │         │  ACADEMIC INSTITUTIONS│
      │    └──────────────────────────────────┘         └──────────────────────┘
      ▲                        ▲                                    ▲
      │    ┌──────────────────────────────────┐                    │
      │    │       DISTRICT INSTITUTIONS       │────────────────────┘
      │    └──────────────────────────────────┘
      ▲                        ▲
      │    ┌──────────────────────────────────┐
      └────│      TALUKA / BLOCK LEVEL         │
           │          INSTITUTIONS            │
           └──────────────────────────────────┘
```