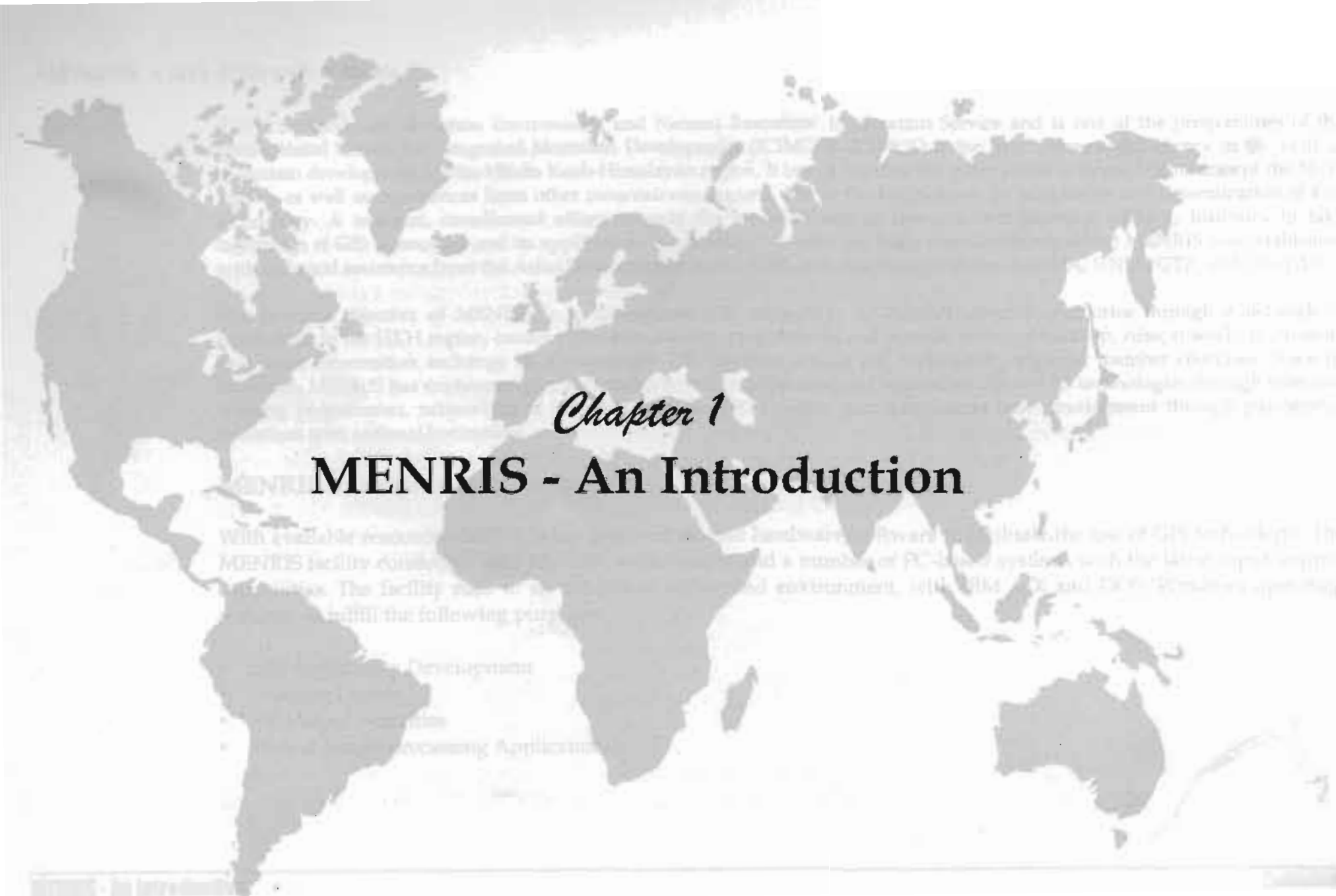


Chapter 1

MENRIS - An Introduction

MENRIS stands for Mountain Environment and Natural Resources' Information Service and is one of the programmes of the International Centre for Integrated Mountain Development (ICIMOD). ICIMOD is the first international agency in the field of mountain development for the Hindu Kush-Himalayan region. It brings together the experiences of the eight countries of the HKH region, as well as experiences from other mountainous regions. Hence the justification for adaptation and dissemination of GIS technology. A regional, coordinated effort towards the establishment of new, or strengthening existing, institutes to take advantage of GIS technology and its applications is essential. It is with this basic objective in mind that MENRIS was established with technical assistance from the Asian Development Bank (ADB) and other support from the ODA, UNEP, GTZ, and UNITAR.

The primary objective of MENRIS is to disseminate GIS technology to ICIMOD member countries through a network of institutions in the HKH region, conduct intensive training programmes, and provide technical back-up. Also, it works to promote and assist information exchange on a compatible GIS platform among the participating regional member countries. Since its inception, MENRIS has envisioned playing a catalytic role in promoting and sustaining GIS and RS technologies through intensive training programmes, networking of institutions in the HKH region, and information base development through partnership initiatives with national institutions.

MENRIS Infrastructure

With available resources, MENRIS has acquired modest hardware/software to facilitate the use of GIS technology. The MENRIS facility consists of IBM RS/6000 workstations and a number of PC-based systems with the latest input/output capabilities. The facility runs in an integrated networked environment, with IBM AIX and DOS/Windows operating systems, to fulfill the following purposes.

- GIS Application Development
- Training Centre
- Data Input Activities
- RS and Image-processing Applications

The support from ESRI to provide ARC/INFO software at university prices is highly commendable. MENRIS has also acquired ERDAS Imaging software for image processing. Besides, MENRIS has the IDRISI and ILWIS software programmes, and these are basically used for training purposes.

During the establishment phase, MENRIS trained its staff in the latest GIS technology and developed training materials. Also, development of pilot GIS case studies has been carried out to demonstrate the applicability of GIS technology.

Training

Many GIS applications have been developed for regions other than the mountains and very few institutions are engaged in GIS training that is focussed on the mountain environment. Because GIS is a relatively new technology in the HKH region, the lack of trained manpower is felt severely. Recognising this fact, the MENRIS programme places training as the highest priority activity. The MENRIS Training Centre is playing an active role in developing and imparting training on GIS with applications associated with the development issues of the mountain environment and its natural resources. Training materials have been developed which are targetted at various audiences: decision-makers, managers, professionals, and technicians. These are being used to conduct training for staff from agencies concerned with mountain development from participating Regional Member Countries (RMCs).

University Level Training

The growing need for trained manpower in GIS can be best served by a university level training programme. Given the fact that GIS is growing as a separate discipline, or science, on-the-job training with a software-oriented approach is not adequate to fulfill the requirements for trained manpower. Owing to the non-availability of GIS infrastructure in the universities, MENRIS is engaged in capacity-building in the universities of the HKH region. A concerted attempt is being made to introduce GIS technology as a part of the university curriculum to fill this gap on a continuous basis.

Networking

A regional mechanism needs to be established to serve as a useful instrument for pooling resources, expertise, and facilities and to work on common problems in the HKH region for the mutual benefit of participating regional member countries through a network of collaborative institutions. It aims at a decentralised approach to regional cooperation in order to provide appropriate technology and applications' development in the HKH region.

The partnership initiative is designed to extend the functional capabilities of national institutions by developing mutually supportive relationships. These relationships initially focussed on training and GIS dissemination activities. Ultimately, MENRIS seeks to develop a robust, productive GIS environment and attain the common goal of an accurate information base which can then be used for natural resource and environmental applications in the region.

Database Development

The success of GIS depends upon the accuracy of the information base. The rapid growth of MENRIS datasets, along with the increasing demand for environmental and natural resources' data, emphasises the need for a coordinated approach to collection and dissemination of digital data in the HKH region. Having established nodal agencies in the RMCs, MENRIS is making an effort to develop a systematic database on a compatible platform for the specific mountain areas in collaboration with the concerned national agencies. Defining common standards for a database on a sub-national/national and regional scale has been the first step towards collection and dissemination.

Scope of Data

Given the vast scope and an inconceivable volume of data, a clear definition is needed concerning the number of factors to be considered for incorporation into a database that would cater to those working for the development of mountain ecosystems. At present, MENRIS is concentrating on the development of GIS for natural resource and environmental applications on various scales.

Scale	Applications
1:1 million	regional-level analysis
1:25,000	country-level analysis
1:50,000/25000	province/district-level analysis
Topography	Settlements, Contours, Roads, Drainage, Land Use, Land Capability, Land Systems
Ecology	Vegetation, Soil, Climate, Biodiversity, Forests
Economic activity	Inputs, Products, Waste, Wealth and Resource Stores
Social Information	Population, Health, Culture

The following are some key issues MENRIS is currently dealing within the process of database establishment.

- Data Standards
- Data Sensitivity
- Data Quality
- Data Dissemination Procedures
- Database Management and Update

Ensuring that the data collected by different institutions, under different programmes and for different purposes, are comparable and compatible will ultimately facilitate the sharing of information in the public domain and provide a sound decision-making process for the development of the mountain region.

ICIMOD

- International Centre for Integrated Mountain Development
- Includes the Mountain Regions of:

Afghanistan,
Bhutan,
India,
Nepal,
Bangladesh,
China,
Myanmar, and
Pakistan.

MENRIS
1990 - 1995

- Mountain Environment and Natural Resources' Information Service
- **Basic Theme**
  Disseminate GIS Technology in the Hindu Kush-Himalayan Region

Objectives

- Awareness through Training/Workshops
- Network: Regional Level Coordination
- Capacity Building
- Clearing House
- Build and Encourage Information Exchange

GIS Technology: An Integrated Approach

- To integrate biophysical data and socioeconomic data
- To monitor the dynamically changing resource base
- To indicate alternative strategies to decision-makers
- To identify viable technological and institutional options for sustainable mountain development

Establishment Phase

- Installation of Hardware/Software
  - In-House Training
- Training
  - Training Manuals, Pilot Case Studies
  - Reviews
- Partnership Initiatives
  - Contact Key Institutions in the RMCs
  - Contact External Institutions

MENRIS Hardware Set-up

- Resource Centre
  - Two IBM RS/6000 Model 530 Units
  - Four IBM X station 120 Units
  - Five Pentium Units
  - Two IBM 3BT Units and Four IBM 43/P Workstations (1996) Units
- Training Centre
  - 5 Pentium Units with A3 size Digitisers
- Data Input Activities
  - Four Pentium Units with A0 size Digitisers
  - A3 size scanner
- Output Capabilities
  - Tektronix A3 size colour printer
  - HP Paintjet XL300 colour printer
  - Two A0 size 8 pen plotters
  - HP Inkjet 755C ('96)

MENRIS Software Resources

- GIS/RS Software

  - Arc/Info 7.03 Workstation (6 Licenses)
  - Arc/Info 6.1 Workstation (6 Licenses)
  - PC Arc/Info 3.4.2 (12 Copies)
  - Erdas Imagine 8.01 (3 Licenses)
  - PC Erdas Imagine 8.2 (6 copies)
  - PC Erdas 7.5 (1 Copy)
  - ILWIS 1.4 (5 Copies)
  - IDRISI 4.1 (5 Copies)

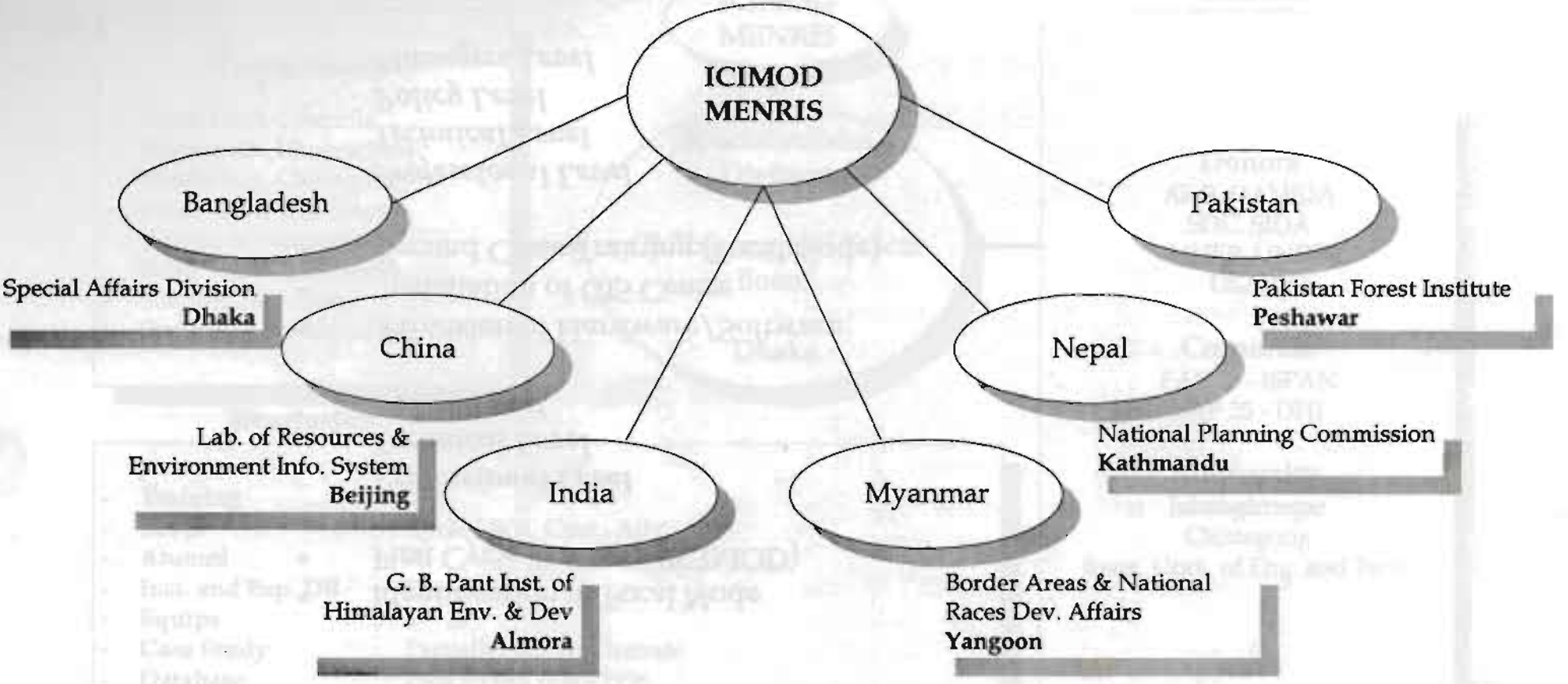
Implementation Phase

- **Mountain Focus GIS Training Centre**
  - improve training curriculum
  - training for IPC agencies
  - publish training handbooks

- **MENRIS Network Establishment**
  - formalise IPC nodes
  - provide two cycles of training
  - conduct collaborative case studies
  - provide compatible hardware/software
  - provide technical back-up

- **Resource Centre**
  - HKH district database build-up
  - establish focal points for research
  - encourage exchange of information
  - dissemination of studies, research

MENRIS Focal Nodes



MENRIS Node Implementation

- Identification of Focal Node
- First Cycle Training (ICIMOD)

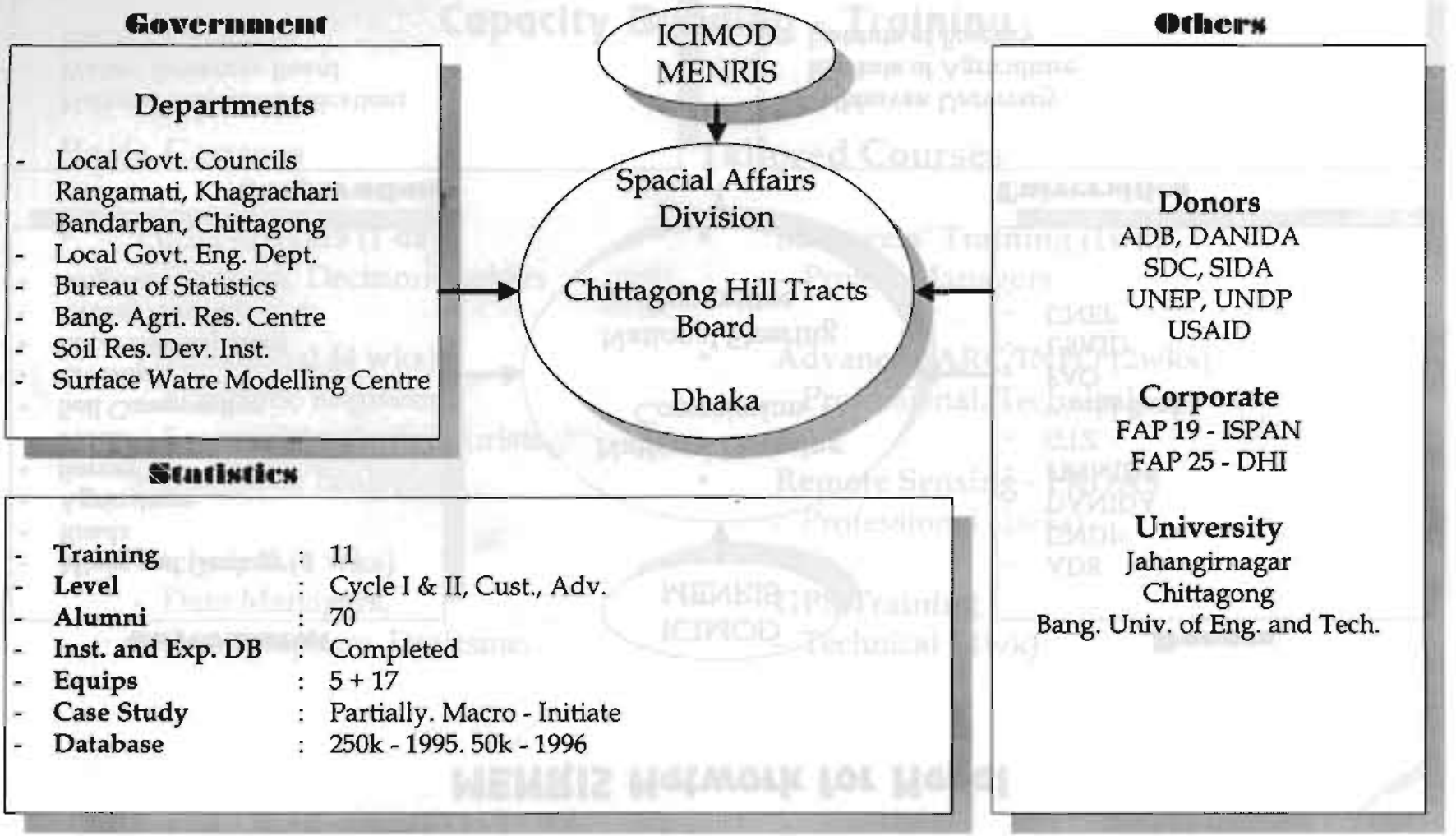
  Professional Level
  Technical Level
  Policy Level

- Provision of Hardware/Software
- Installation of GIS Centre
- Second Cycle Training (Focal Node)

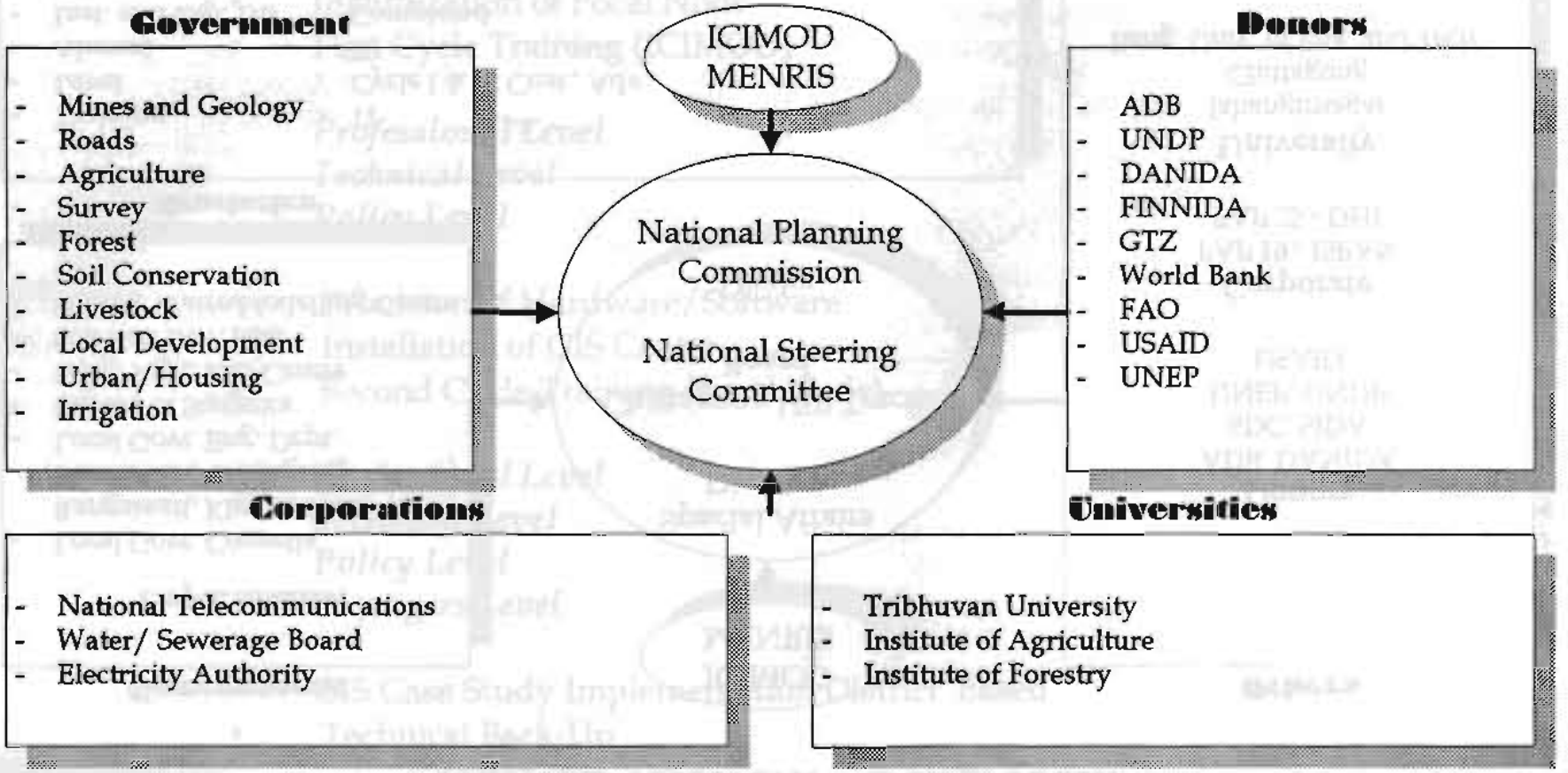
  Professional Level
  Technical Level
  Policy Level
  Managers Level

- GIS Case Study Implementation District Based
- Technical Back-Up

MENRIS Network - Bangladesh



MENRIS Network for Nepal



Capacity Building - Training

Basic Courses

- **Policy-makers (1 day)**
  - Planners, Decision-makers
- **Professional (4 wks)**
  - Foresters, Engineers
  - Economists, Agriculturists
  - Scientists, Ecologists
- **Technical (4 wks)**
  - Data Managers,
  - Cartographers, Draftsmen

Tailored Courses

- **Managers' Training (1wk)**
  - Project Managers
- **Advanced ARC/INFO (2wks)**
  - Professional, Technical
- **Remote Sensing - ERDAS**
  - Professional (3wks)
- **GPS Training**
  - Technical (1wk)

Case Studies	Collaboration with
• *Melamchi Water Transfer*	*Dept. of Mines*
• *Settlement Mapping Using GIS*	*ODA*
• *Livestock Carrying Capacity*	*GTZ*
• *Service Centre Location*	*UNDP*
• *Lamjung District Info. System*	*GTZ*
• *Planning Agri. Development in Gorkha-Baseline Data*	*GTZ*
• *Climatic Atlas*	*DOMH*

GIS Databases

- **Scale**
  - 1:1 million — regional level
  - 1:250,000 — country level
  - 1:25,000/50,000 — district/provincial level

- **Scope of Data**
  - topography
  - ecology
  - socioeconomic activity

Database Issues

- Data Access
- Data Standardisation
- Data Sensitivity
- Data Quality
- Data Dissemination Procedures
- Database Management and Update

Future Strategies

- Work Closely with National Institutions in the HKH Region in GIS and Remote Sensing Applications
- Build-up Regional Databases on Natural Resources and the Environment
- Advanced Training Centre
- Exploit New Technology Development
- Satellite/Radar/GPS Technology
- Conduct Collaborative Applications
- Consultative Role

MENRIS Appeal

- Encourage Information Exchange
- Encourage All Work in Digital Form
- Adhere to Compatible Hardware/Software Platforms
- Stress Non-Duplication of Effort