Kathmandu Valley GIS Database
Bridging the Data Gap

Basanta Shrestha
Sushil Pradhan

ICIMOD
UNEP

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International Centre for Integrated Mountain Development
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FOREWORD

Because of rapidly growing populations and a dwindling resource base in mountain areas, sustainable development involves greater and conflicting demands on available resources. Decision-makers need to monitor and analyse the changing resource bases of specific ecosystems in order to make informed choices. Modern Information Technologies, such as GIS, RS, and GPS, can facilitate this. These technologies allow planners to process large volumes of data from multiple sources. These data can be integrated to produce maps, monitor changes, and model the impact of management decisions. GIS and related technologies improve data handling capabilities and encourage different stakeholders to re-examine their roles with respect to the supply and availability of data both in terms of bio-physical and socioeconomic aspects. The demand for accurate and homogeneous spatial data has clearly been established by research and development communities. There is hardly anywhere in the HKH area that is as much in need of a reliable and dynamic database as the Kathmandu Valley in Nepal. Rapid urban expansion is taking over fertile agricultural land and scenic spots. The increasing population needs basic services such as water, electricity, telephones, and other essential infrastructure.

With support from the United Nations Environment Programme (UNEP/EAP-AP), ICIMOD facilitated the establishment of an Environment, Information, and Assessment (EIA) Unit at the Ministry of Population and Environment, HMG, Nepal. One of the components of the EIA project was to carry out a Kathmandu Valley GIS study with the aim of preparing a core GIS Database. This study was taken up as a pilot study to raise awareness about the potential of the technology and its usefulness in planning and decision-making.

The study established a core Kathmandu Valley GIS database based on available maps and remote-sensing images. It is hoped that the database will be used as a starting point for research and development activities in planning and management of the Valley. This document serves to raise awareness about the existence of digital data, and it will hopefully serve to avoid duplication of efforts in future. To encourage and improve information exchange the database and the complete publication are available on an interactive CD-ROM.

This study was undertaken by Mr. Basanta Shrestha, Systems' Specialist, and Mr. Sushil Pradhan, GIS Analyst. Digitisation of the topographic database was undertaken by Mr. Anirudra Man Shrestha, senior cartographer at MENRIS. Other MENRIS staff who assisted in the study are 'Mr. Pradeep Mool, Mr. Birendra Bajracharya, Mr. Sushil Pandey, Mr. Govinda Joshi, Mr. Saisab Pradhan, Ms. Mona Thapa, and Ms. Monica Moktan. EIA project staff at MoPE, Mr. Bhusan Pradhan, Mr. Manohar Bhattarai, Ms. Sunjita Pradhan, and Mr. Madhav Adhikari, have assisted in the compilation of data sets. On behalf of ICIMOD, we would like to thank them all for their contributions. We would also like to thank Mr. Surendra Shrestha, Regional Coordinator of the United Nations Environment Programme, Environment Assessment Programme – Asia Pacific (UNEP- EAP/AP) for his inputs and for facilitating th financial support of UNEP. Lastly, we would like to express our sincere thanks and appreciation to the Ministry for all the support provided for this study.

Pramod Pradhan
Head - MENRIS
ICIMOD

Egbert Pelinck
Director General
ICIMOD

ABSTRACT

Recently, there has been a continuing growth in the use of GIS and related technologies by many organizations engaged in planning and management of the Kathmandu Valley. As a result, the demand for accurate standardised spatial data of the Valley for government use as well as for use by research and development organizations has grown.

This study is about attempts to build a comprehensive GIS Database of the Kathmandu Valley as a means of bridging important data gaps. The study employs a fresh approach using the maps available and integrating with satellite images. The maps presented in this publication visualise the environment and raise awareness about digital databases. It is hoped that the application presented in this publication will increase awareness about the usefulness of digital databases and demonstrate what can be achieved with GIS and related technologies. It is also hoped that this database will improve information on the Kathmandu Valley and assist different stakeholders engaged in planning and management of services.

Furthermore, the study advocates a building block approach to development, management, and revision of databases in a complementary way to avoid duplication of efforts in costly production of digital data. The study aims to sensitise senior executives and decision-makers about the need for a sound policy on database sharing, development, and standards. Such a policy, at the national level, known as a National Spatial Database Infrastructure (NSDI), should evolve in order for everyone to benefit from the prevailing GIS technology. In using GIS and related technologies, the study facilitated the establishment of a Spatial Data Infrastructure of the Kathmandu Valley.

ADEOS	Advanced Earth Observation Satellite
AML	Arc Macro Language
AVNIR	Advanced Visible and Near – Infrared Radiometer
CBS	Central Bureau of Statistics
CD-ROM	Compact Disc – Read Only Memory
DBMS	Database Management System
DEM	Digital Elevation Model
DHUD	Department of Housing and Urban Development
DOS	Department of Survey
DTM	Digital Terrain Model
DWSS	Department of Water Supply and Sanitation
EAP-AP	Environment Assessment Programme – Asia Pacific
EIA	Environment Information and Assessment
ESRI	Environmental Systems Research Institute
ERDAS	*Trade mark of ERDAS Inc., developer of ERDAS Imagine software*
FINNMAP	Finnish Map
FCC	False Colour Composite
GIS	Geographic Information Systems
GPS	Global Positioning System
GCP	Ground Control Points
HKH	Hindu-Kush Himalayas
HMG/N	His Majesty's Government of Nepal
HRV	High Resolution Visibility
IBM	International Business Machine
IRS	Indian Remote Sensing Satellite
KMC	Kathmandu Metropolitan Office
KUDP	Kathmandu Urban Development Project
ICIMOD	International Centre for Integrated Mountain Development
IUCN	International Union for Conservation of Nature
LANDSAT	Land Observation Satellite
LRMP	Land Resource Mapping Project
MENRIS	Mountain Environment and Natural Resources' Information Service
MoPE	Ministry of Population and Environment
MSS	Multi-spectral Scanning
NEPAP	Nepal Environmental Policy and Action Plan
NSDI	National Spatial Data Infrastructure
NTC	Nepal Telecommunications Corporation
PAN	Panchromatic

RS	Remote Sensing
RDBMS	Relational Database Management Systems
SPIN	Space Information
SPOT	Satellite Probatoire d'Observation de la Terre
TM	Thematic Mapper
TCC	True Colour Composite
VDC	Village Development Committee
UNEP	United Nations Environment Program
UTM	Universal Transverse Mercator System
XS	Multi-spectral

LIST OF MAPS

Map 1 Index Contours at 20 Metres Intervals
Map 2 Elevation Zones
Map 3 Hill Shade of Digital Elevation Model (DEM)
Map 4 Slope Map
Map 5 Aspect Map
Map 6 Road Network
Map 7 Road Network: Core Urban Area
Map 8 Drainage Network
Map 9 Sources and Type of River Water Pollution
Map 10 Location of Services
Map 11 Land Cover Map, 1995
Map 12 Land Cover, 1978/79
Map 13 Land Capability
Map 14 Land Systems
Map 15 Administrative Map
Map 16 Population Density by VDC, 1991
Map 17 Household Distribution by VDC, 1991
Map 18 Percentage of Males by VDC, 1991
Map 19 Percentage of Females by VDC, 1991
Map 20 Male and Female Population by VDC, 1991
Map 21 Forest Land per VDC, 1995
Map 22 Forest Land per Person per VDC, 1995
Map 23 False Colour Composite (Red:4, Green:3, Blue:2) of Landsat-TM Image, 1988
Map 24 False Colour Composite (Red:4, Green:3, Blue:2) of Landsat-TM Image Draped on DEM, 1988
Map 25 Land Cover Based on Landsat-TM Image, 1988
Map 26 Land Cover Based on Landsat-TM Image, 1988, Image Draped on DEM
Map 27 True Colour Composite (Red:3, Green:2, Blue:1) of ADEOS-AVNIR Image, 1997
Map 28 True Colour Composite of ADEOS-AVNIR Image Draped on DEM, 1997
Map 29 Land Cover Based on ADEOS-AVNIR M Image, 1997
Map 30 Land Cover Based on ADEOS-AVNIR Image, 1997, Draped on DEM
Map 31 SPIN-2 Two Metre KVR-1000 Image, 1991
Map 32 SPIN-2 Two Metre KVR-1000 Image, 1991 (Core Urban Area)
Map 33 SPIN-2 Two Metre KVR-1000 Image, 1991, Draped on DEM
Map 34 SPIN-2 Two Metre KVR-1000 Image, 1991, Merged with ADEOS-AVNIR, 1997 Image
Map 35 SPIN-2 Two Metre KVR-1000 Image, 1991, Merged with ADEOS-AVNIR, 1997 Image
Map 36 Land Cover Based on Merged SPIN-2, 1991 and ADEOS-AVNIR Image, 1997
Map 37 Land Cover Based on Merged SPIN-2, 1991 and ADEOS-AVNIR Image, 1997, Draped on DEM
Map 38 False Colour Composite (R3 G2 B1) of SPOT-XS HRV1 Image, 1986
Map 39 False Colour Composite (FCC) of SPOT-XS HRV1 Image, 1986, Draped on DEM
Map 40 Land Cover Based on SPOT-XS HRV1 Image, 1986
Map 41 Land Cover Based on SPOT-XS HRV1 Image, 1986, Draped on DEM
Map 42 Merged (SPIN-2, 1991, and SPOT-XS, 1986) Image
Map 43 Land Cover Based on Merged SPIN-2, 1991 and SPOT-XS HRV1 Image, 1986
Map 44 IRS1-C Satellite Image, 1996

Map 45 False Colour Composite (R3 G2 B1) of SPOT-XS HRV1 Image, 1991
Map 46 False Colour Composite (R3 G2 B1) of SPOT-XS HRV1 Image, 1994
Map 47 SPOT-PAN Ortho Image, 1986
Map 48 Land Cover Change between 1978 – 1995
Map 49 Land Cover Change between 1988-1997
Map 50 Land Cover Change Based on Merged SPIN-2 with SPOT XS Image, 1986 and ADEOS-AVNIR Image, 1997
Map 51 Urban Growth between 1978-1995
Map 52 Urban Growth between 1988-1997
Map 53 Hazard-prone Urban Growth between 1978-1995
Map 54 Agricultural Lands by Slope Category, 1995
Map 55 Agricultural Lands under Most Unsuitable Farming Systems, 1995
Map 56 Land Suitable for Forestry and Fruit Farming, 1995
Map 57 Land Suitable for Cereal and Cash Crops, 1995
Map 58 Land Suitable for Non-arable Crops, 1995
Map 59 Areas Suitable vs Existing Carpet Industries, 1995
Map 60 Endangered Forest, 1995

LIST OF FIGURES

Figure 1 Kathmandu Valley Based on the Watershed Boundaries
Figure 2 Location of Kathmandu, Lalitpur, and Bhaktapur Districts
Figure 3 Overall Methodology of GIS Database Development
Figure 4 Reference System for Topographic and LRMP Map Sheets
Figure 5 Methodology Applied for the Preparation of a Topographic Database
Figure 6 Applied Methodology for Preparation of the Image Database
Figure 7 The Integrated Database
Figure 8 Existing Land Cover Map of the Study Area
Figure 9 Digital Elevation Model (DEM) of the Study Area
Figure 10 Slope Map
Figure 11 Aspect Map
Figure 12 Cost Surface
Figure 13 Accumulated Cost Distance
Figure 14 Proposed Environmentally Least Cost Path

LIST OF TABLES

Table 1 List of the Topographic Database of the Kathmandu Valley
Table 2 Integration of Socioeconomic Information at the VDC Level
Table 3 List of the Satellite Imageres Included in the Kathmandu Valley GIS Database
Table 4 List of GCPs Used for the Geo-correction of Satellite Images
Table 5 Weight Score Values for Land-cover Classes
Table 6 Weight Score Values for Slope Classes
Table 7 Weight Score Values for Aspect Classes
Table 8 Matrix of Land-cover Change between 1978-1995 (area in sq. km.)
Table 9 Matrix of Land-cover Change between 1988-1997 (area in sq. km.)
Table 10 Matrix of Land-cover Change between 1986-1997 (area in sq. km.)
Table 11 Urban Growth in Kathmandu Valley Derived from Various Sources

TABLE OF CONTENTS

Foreword
Abstract
Acronyms
List of Maps
List of Figures
List of Tables

1. Background 1
2. The Context and Rationale 1
3. The Need for a GIS Database 2

   3.1 Critical Issues in GIS Database Development 2
   3.2 Existing Scenario 2

4. Geo-Information Technology - An Integrating Tool 3

   4.1 Application of GIS in a Mountain Environment 4

5. The Study Area: Kathmandu Valley 5
6. Objectives of the Study 5
7. GIS Database Design and Development 6

   7.1 Topographic Database 6
   7.2 Integration of Socioeconomic Information 39
   7.3 Satellite Image Database 57
   7.4 Integrated GIS Database 111

8. Potential GIS Applications 111

   8.1 Potential GIS Application I: Cost Distance Modelling 111
   8.2 Potential GIS Application II: Land-cover Change Analysis and Urban Growth Detection 113
   8.3 Urban Growth Detection 116
   8.4 Potential of GIS Application III: Suitability Analysis 131

9. Conclusions and Recommendations 147

Bibliography 148

Annex 1: Glossary of Technical Terms 151
Annex 2: Data Dictionary of Kathmandu Valley GIS Database 157
Annex 3: Maps of the Kathmandu Valley 185
Annex 4: Optical Sensor System Characteristics of Earth Resource Satellites 191
Annex 5: Data Access and Availability 195