

The Nepal Biodiversity Resource Book Project

Background

Biodiversity Profiles of Nepal (BPN) 1996 is a scientific milestone in the methodical documentation and presentation of then available information, published as well as field observations, about biodiversity in Nepal. BPN systematically distinguished, compiled, and presented findings pertinent to a biodiversity inventory of Nepal in 16 volumes spread over 1,500 pages (Table 1). In the profiles, Nepal's flora and fauna are categorised by physiographic zones and protected areas. The documents recorded in total 181 mammal species belonging to 12 orders and 39 families (Suwal and Verheugt 1995). BPN 1996 recorded numerous other fauna of various orders including 844 species of birds, 100 species of reptiles, 43 species of amphibians, 185 species of freshwater fish, and 635 butterfly species. Of the 635 butterfly species, four species and 25 subspecies are possibly endemic. In the context of flora, BPN recorded 5,160 species of flowering plants and 1,120 species of non-flowering plants (bryophytes and pteridophytes) (BPP 1995).

Meticulous documentation in this publication has highlighted and promoted Nepal's magnitude of wealth of biodiversity in the world conservation arena. BPN ranks Nepal as a country harbouring the 10th richest flowering plant diversity in Asia, and the 31st in the world.

From October 1994 to January 1996, over 70 Nepalese and 30 foreign experts representing 28 institutions and eight projects worked to complete the **Biodiversity Profiles Project (BPP)**, generously contributing data and assistance in the preparation of all 16 volumes. Twenty-one experts contributed information for the texts. The

BPP was a major undertaking of the Government of Nepal, Ministry of Forests and Soil Conservation (MFSC) and the Department of National Parks and Wildlife Conservation (DNPWC) and was carried out with financial support of the Government of the Netherlands.

BPN documents have subsequently become a foundation for the Nepal Biodiversity Strategy 2002 (NBS), and its Implementation Plan 2003. They were also instrumental in enhancing the implementation of the Master Plan for the Forestry sector, the National Conservation Strategy for Nepal, numerous national development plans, and various conservation projects in and around Nepal's protected areas. The document has become a major source of information and reference on biodiversity for researchers, protected area managers, policy makers, and others.

Rationale

Nepal has made further progress in biodiversity conservation and management of protected areas since 1996, when the BPN documents were first published. An additional 8,778 km² of protected areas have been added to Nepal's protected areas from 1996 to 2004. The areas gazette-notified as 'protected' since 1996 include Shivapuri National Park, Kangchenjunga and Manaslu conservation areas, and 11 buffer zones.

Wetlands in Nepal are rich in biological diversity and are known to support more than 20,000 waterfowls during peak migratory periods between December to February. In 1996, IUCN-Nepal prepared a detailed wetlands inventory of 163 sites from the Terai, and 79 sites

Table 1. Bibliographical List of BPN documents

TPN*	Title	Contributors	Date	Pages
1	Biodiversity Assessment of Terai Wetlands	WJM Verheugt	December 1995	xi+80
2	Enumeration of Amphibians and Reptiles of Nepal	K Shah	December 1995	vii+60
3	Enumeration of Lichens of Nepal	Dr LR Sharma	December 1995	vi+111
4	Red Data Book of the Fauna of Nepal	RN Suwal and WJM Verheugt with contribution from HS Nepali "Kazi" and C Smith	December 1995	xi+58
5	Enumeration of Spiders of Nepal	Dr VK Thapa	December 1995	v+43
6	Enumeration of the Mammals of Nepal	RN Suwal and WJM Verheugt	December 1995	x+86
7	Biodiversity Assessment of Forest Ecosystems of the Westerns Mid Hills of Nepal	P Bista, K Shah, P Shrestha, WJM Verheugt	December 1995	x+65
8	Biodiversity Assessment of Forest Ecosystems of the Central Mid Hills of Nepal	K Shrestha, P Budhathoki, HS Nepali "Kazi" and WJM Verheugt	December 1995	x+49
9	Biodiversity Forest Ecosystems of the Eastern Mid Hills of Nepal	PM Acharya, HR Bhandary, NK Khadka and WJM Verheugt	December 1995	x+47
10	Enumeration of Fishes of Nepal	J Shrestha	December 1995	vii+64
11	Enumeration of Algae of Nepal	Dr Sushim R Baral	December 1995	iv+153
12	Biodiversity Profiles of the Terai and Siwaliks Physiographic Zones	SJ Keeling, RN Suwal and WJM Verheugt; with contribution from HS Nepali "Kazi", Dr PR Shakya, C Smith and B Upreti.	December 1995	xix+136
13	Biodiversity Profiles of the Mid Hills Physiographic Zones	SJ Keeling, RN Suwal and WJM Verheugt; with contribution from HS Nepali "Kazi", Dr PR Shakya, C Smith and B Upreti.	December 1995	xviii + 151
14	Biodiversity Profiles of the High Himal /High Mountains Physiographic Zones	SJ Keeling, RN Suwal and WJM Verheugt; with contribution from HS Nepali "Kazi", Dr PR Shakya, C Smith and B Upreti.	December 1995	xvii+178
15	An Assessment of the Representation of the Terrestrial Ecosystems in the Protected Area system of Nepal	WJM Verheugt; with contribution from Dr PR Shakya and SJ Keeling	January 1996	viii+23
16	Opportunities for Investment in Biodiversity Conservation Nepal	P Budhathoki, with contributions from LP van Lavieren and WJM Verheugt	December 1995	x+29

*TPN = Technical Publication Number

Source: Nepalnature.com based on BPN 1996 documents

from the hills and mountains (IUCN-Nepal 1996). In consideration of BPP's emphasis on conservation, 10 wetland sites were recommended for legal protection (HMG/N/MFSC 2002). Three sites, Beeshazar Tal, Jagdishpur Reservoir, and Ghodaghodi Tal, were designated as Ramsar sites in 2003 (DNPWC 2004).

BPN documents 844 species of birds recorded by 1996; current records document 852 (Grimmet et al. 2000). At least seven additional species of birds have been recorded in Nepal recently, including the Asian glossy starling, Loon, and White fronted goose in the Koshitappu Wildlife Reserve (KWR); the Moustache fly-

catcher, and Finn's baya in the Shuklaphanta Wildlife Reserve; and the Tibetan sandgrouse in the Annapurna Conservation Area (Kazi 2005, Choudhary, B. 2003, and Shah et al. 2002). Similarly, 151 species of birds were recorded in Shivapuri National Park – then referred to as the Shivapuri Watershed and Wildlife Reserve – in 1996 (BPP 1996); 177 were recorded in 2002 (DNPWC 2002). More recent studies in 2005 document 311 species (Kazi and Suwal 2005). In February 2005, Nepal Nature dot Com handed over the newly updated checklists of birds and flowering plants to the Government of Nepal (Shakya, PR 2005).

Much progress has also been made in documenting species of flowering plants since the BPN was released. Current records indicate existence of about 6,391 such species; BPP records in 1996 documented only 5,160. In 1998, research by Akiyama et al. (1998) added a further 50 species of flowering plants from Nepal to the BPN list. In 2003, Rajbhandari incorporated new records of Gramineae and Orchidaceae families, and 104 additional species of 35 families of flowering plants from Nepal (Rajbhandari, KR 2003). Similarly, a species of orchid, *Oberonia nepalensis*, has been reported recently as endemic to Nepal and is another addition to Nepal species of angiosperm (Shakya and Chaudhary 1999).

A new chapter on the science of entomology in Nepal has been introduced following the publication of the inventory of insects of Nepal in 1997 and 1998. Prior to those years, BPN documented only 635 butterflies representing the entire field of entomology (BPP 1996). The entomological inventory in 1997 recorded 536 species under 17 orders from Protura to Odonata (Thapa 1997); 789 species of moths and 656 species of butterflies were subsequently recorded in 1998 (Thapa 1998). Of the recorded 5,052 known species of insects, 1,131 species (over 22%) were first discovered and described from Nepali specimens (Thapa 1998).

Goal and objective

The goal of the **Nepal Biodiversity Resource Book Project** (NBRBP) is to establish a system of updating Nepal's biodiversity annually in order to pave the way for Nepal Biodiversity Resource Books 2006, 2007, 2008, and so on, based on scientific studies.

The primary objective of NBRBP is to prepare a yearbook on Nepal's biodiversity for 2006 by updating the 1996 Biodiversity Profiles of Nepal based on information published between 1996 and 2005, as well as field verification.

Methodology

Compilation of the resource book was carried out in five stages from preparatory planning to publication. Each stage consisted of a complete task of activities that were prerequisite for the successive stages. A timeline was drawn with the

assumption that activities would continue according to the plan.

Preparatory stage

Nepal Nature dot Com (NNC) developed the concept of updating BPP 1996 upon consultation with relevant authorities and experts. The major steps in this process were the following.

- Conceptualisation of the project (NBRBP) and Biodiversity Resource Book publications from 2006 onwards
- Consultation with the Government of Nepal (GoN) for endorsement and advice on the concept of the NBRB
- Approval from the GoN for initiating the resource book project activities
- Resource mobilisation to implement the NBRB project

Working team formation stage

Upon completion of the preparatory stage, NNC formed a working team to implement the NBRB Project. Team formation was based on the BPP approach in 1996 with certain modifications. Resource persons and contributors to the BPP continuing their inventory research under various capacities were contacted for updated data and information.

The major steps were as follows.

- Preparation of the terms of reference for experts and job descriptions for staff
- Identification and contracting out to relevant experts
- Appointment of support staff
- Establishment of the NBRBP office
- Establishment of the NBRBP reference library

Scoping stage

The scope of the proposed publication was initiated following establishment of the NBRBP office and team.

- Literature surveys were carried out of:
 - BPP documents
 - Contemporary documents published since 1996
 - Unpublished information
 - Relevant websites
- Selection of tools for consultation and field verification
- Preparation of a Nepal Biodiversity Resource Book (NBRB) format including the table of contents, presentation, and language with the NBS document as a reference point

- Preparation for production of print and digital copies of NBRB 2006, including texts, graphics, and illustrations

The check lists of fauna and flora compiled for the resource book were derived primarily from the BPP documents. The checklists were updated referring to recent publications of Bird Conservation Nepal (BCN), the departments of Plant Resources (DPR), and National Parks and Wildlife Conservation (DNPWC), the World Conservation Union (IUCN), National Trust for Nature Conservation (NTNC), World Wildlife Fund Nepal Program (WWF), UNESCO, and Nepal Nature dot Com (NNC). Reference to the personal collections of Dr Puspa Ratna Shakya were also made in order to update the plants checklist, as well as to those of Mr Hari Sharan Nepali 'Kazi' for the birds checklist.

In general, the **Nepal Biodiversity Resource Book** follows the practices adopted in the IUCN Red List, CITES Appendices, and the BPP checklist in identifying plant and animal species by a binomial nomenclature (genus and species in Latin) without authorships (See www.iucnredlist.org and www.cites.org/eng/appendices.shtml).

However, in the case of phanerogams (plants that reproduce by means of seeds not spores) the authors' names have been attached to the binomial nomenclature to avoid possible confusion where there are multiple authors to the same species and infraspecific levels of biological diversity.¹ (See **Annexes 1.4** and **1.5**).

Nepali names (enclosed in single quotation marks ' ') for various plant and animal species are only partially available at present and standards need to be set for their spelling. The same Nepali names sometimes denote more than one species, and the names also vary from place to place. Efforts made to coin new Nepali names for some species have found dissenters among the general public and consensus has not been reached. There are also non-Nepali vernacular names specific to each species in other languages such as Maithili, Newari, Sherpa, Tamang, Tharu, among others. A separate work needs to be undertaken to document as well as coin local nomenclature for

plant and animal species in the various Nepal languages.

Where possible, the English common names of the birds and mammals are provided in this book. But in the case of flora and some species of herpeto and fish mostly found only in the Himalayan region and with no English equivalent common names only their scientific names are given. Again, separate work needs to be undertaken to find out or coin English common names for these species. Scientific names are also no longer repeated after second or third mention.

The literature survey was an ongoing process that continued until the final version of the resource book was ready for printing.

Verification stage

The information collected was cross-checked, verified, authenticated, approved, and finalised through:

- Participatory workshop with experts for technical cross-checking, verification and authentication;
- Field verification and consultation with field staff;
- Consultative workshop with policy makers for authentication;
- Preparation of the comprehensive English version of NBRB 2006, as well as the summarised version in Nepali;
- Language editing for both versions;
- Preparation of the final rendering of NBRB 2006 following necessary amendments and improvements.

The first draft of the resource book was reviewed by several specialists in their respective fields: Mr Shyam Bajimaya for fauna and protected areas, Dr Tirtha Bahadur Shrestha for flora. Mr Rajendra Suwal and Mr Hari Sharan Nepali 'Kazi' also reviewed the documents over the entire preparation process. A team of experts from the International Centre for Integrated Mountain Development (ICIMOD) also reviewed the first draft for overall perspective on biodiversity in the publication.

A consultative meeting was held in Kathmandu on 28 November 2006 to discuss the

¹ Infraspecific levels mean taxa below species such as subspecies, variety and forma

draft report and seek suggestions and inputs from experts representing various conservation organisations. Along with access to the digital version of the resource book, the Ministry of Environment, Science and Technology (MOEST) sent out invitation letters to 16 organisations for their participation and feedback on the draft book. Twenty-six experts including reviewers representing 13 organisations² participated in the book consultation meeting.

Production and dissemination stage

- The final versions of NBRB 2006 (both in Nepali and English) were prepared for printing and digital production.

Outputs

The major outputs were the two documents in English and Nepali, as well as the digital versions of both.

- a. Nepal Biodiversity Resource Book 2006 (English): over 150 pages including illustrations, pictures, and maps
- b. Nepal Biodiversity Resource Book 2006 (Nepali): a summary of the English version, is forthcoming

Limitations

NBRB 2006 focused on the diversity of flora and fauna in protected areas, Ramsar sites, and World Heritage sites of Nepal with primary focus on higher plants and animals, along with general checklists of flowering plants and animals of Nepal.

How the document is organised

This document is organised in seven chapters. Chapter One presents the study background, objectives, and methodology. Chapter Two presents the country background including location, physiographic, climate, soil, river

systems, land use, population and human development, and natural resources of economic significance. The chapter also includes brief notes on relevant national acts, regulations and policies, international conventions and treaties, and protected areas.

The third chapter evaluates the biogeographical assessment of Nepal focusing on biogeography, vegetation types, diversity at different altitudes (Terai-Sivaliks below 1000m, Mid-Hills between 1000m and 3000m, Highlands above 3000m), and species diversity (flora, fauna, distribution, endemism, threatened and protected species, and species in protected sites).

The document includes two sets of data, one pertaining to flora (Annex 1), and another to fauna (Annex 2). Biodiversity Profile Nepal (BPN) data have been used as benchmarks. The Nepal Biodiversity Resource Book followed the BPN system to prepare lists of floral and faunal species found in the protected areas. Two additional classifications of global significance, the Ramsar and World Heritage sites, have also been added.

Reviews of the protected areas are presented in Chapter Four. The fifth and sixth chapters highlight the Ramsar sites (RS) and the World Heritage sites (WHS). Documentation of all three areas includes basic observations and are arranged to reflect the background, significance, and achievements pertinent to biodiversity of individual sites. A conclusion of the findings of the earlier chapters is presented in the seventh chapter. Recommendations for consideration as indicated by the study complete the document and are presented in Chapter Eight.

A total of three annexes with 65 sub-annexes supplement this report. They are included on a CD-ROM in a pocket at the back of the report.

² BCN, Central Department of Zoology-Tribhuvan University, DNPWC, DPR, IUCN, ICIMOD, MoEST, NNC, NTNC, Natural History Society of Nepal, Nepal Botanical Society, Nepal Foresters' Association, and WWF.



Bhaktapur, the most medieval of the three cities of Kathmandu Valley World Heritage Site
(Sharad Joshi)