

Conservation of biodiversity – current practices national legislation and international conventions and treaties, and biodiversity prospects and intellectual property rights.

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Biodiversity conservation

Background

- Conservationists' focus has expanded from the objective of establishing beautiful parks and conserving select species towards a more holistic goal of ecosystem integrity; a goal that goes well beyond the conservation of individual species and beautiful landscapes to include the protection of the existing diversity of species, natural habitats, and ecosystem processes.
- Fundamental questions about goals and strategies, particularly
 - ① What biodiversity should be conserved; e.g., should the focus be particular species, ecosystems, or ecosystem services?
 - ② Where does the targeted biodiversity occur, and where is the best place to protect it? and
 - ③ Given the variety of conservation tools available, which is the most effective method to achieve conservation objectives?
- Traditional form of contribution to conservation effort due following peoples:
 - Geographers
 - Ethnobotanists
 - Plant ecologists
- Interplay of physical diversity and human management diversity gives rise

Operational considerations

- Hotspots approach to defining what should be conserved or coarse-filter/fine-filter approach that ensures that a given landscape's naturally occurring species and ecological communities are protected.
- Identifying the appropriate conservation landscape scale (Species/taxa or spatial scale)
- Need for multiple conservation operational tools (Governance based, Market based, Civil society based)
- Economic evaluation and conservation trade-offs with competing resource demands
- Use of "easy" tools (i.e., GIS models and remote sensing data) to resolve ecological features and processes and design interventions.

Causes of biodiversity loss

Major drivers

- Habitat loss, overexploitation, alien species introductions, and climate change have resulted in significant losses to biodiversity, especially over the past 50 years.
- These drivers are influential both in protected as well as open areas.
- Within protected areas
 - range of physical (e.g., fire),
 - biological (e.g., alien species),
 - social (e.g., community opposition),
 - political (e.g., political support),
 - economic (lack of resources), and
 - managerial (e.g., lack of planning) threats are faced by biodiversity

Forms of biodiversity conservation

On farm conservation

- Seed preservation by farmer household
- Participatory variety breeding
- Culture based importance for conservation

Protected area conservation: History

- As long as 2000 years ago ancient societies in Greece, Rome, Asia, and Africa are known to have set aside areas as sacred groves or sites, while European societies had hunting grounds for use of royalty and the wealthy.
- First protected area of world: Yellowstone National Park (1872).
- Until recently, the motivations have seldom been the protection of biodiversity *per se*, and have usually been based on culturally valued aspects of biodiversity and the broader landscape, for example, charismatic megafauna, attractive habitats, important watersheds, recreational areas, or endangered species.
- Multiple functions of protected areas:
 - Scientific research,
 - Wilderness protection,
 - Preservation of species and genetic diversity,
 - Maintenance of environmental services,
 - Protection of specific natural and cultural features,

- Multiple functions . . .
 - Tourism and recreation,
 - Education,
 - Sustainable use of resources from natural ecosystems, and
 - Maintenance of cultural and traditional attributes

Protected area: Components

International Union for Conservation of Nature

A clearly defined geographical space, recognized, dedicated and managed through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.

- 12.9% (114,000 sites) of earth's land surface now occur under protected areas.

- IUCN categories of protected areas: 1a. Strict Nature Reserves; Areas set aside to protect biodiversity and possibly geological features within strict control of visitation, use and impact. 1b. Wilderness Areas; Largely unmodified or slightly modified area, retaining natural character without human habitation.
 - ② National Parks; Natural or near natural areas to protect large scale ecological processes
 - ③ Natural Monuments or Features; Landform, Sea mount, Submarine cavern, Cave, Living creature
 - ④ Habitat/Species Management Areas; Particular species or habitats and management
 - ⑤ Protected Landscape/Seascape: Area of interaction of people and nature
 - ⑥ Protected area with sustainable use: Large area, low level industrial use of natural resource, with cultural associations for natural resource management.

Status of protected areas

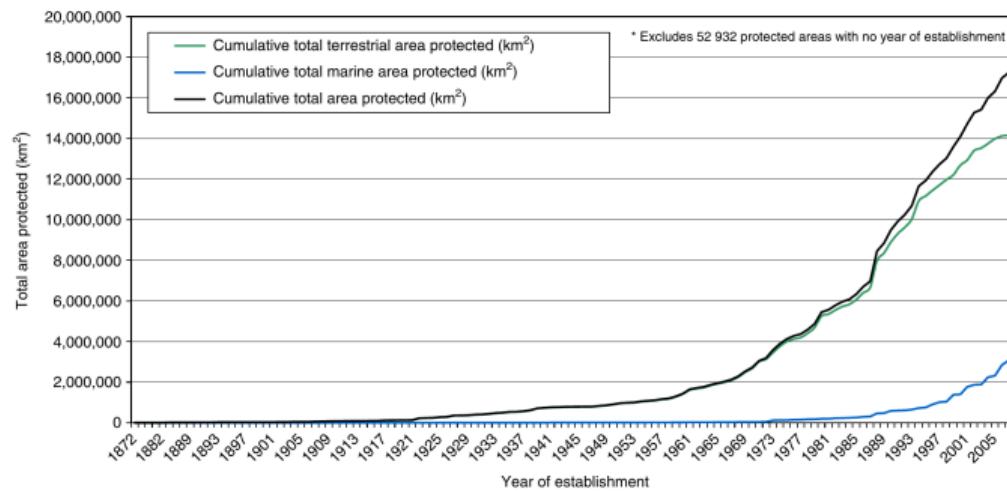


Figure 1: Global growth in protected areas. Reproduced from IUCN and UNEP-WCMC (2009).



Figure 2: Protected areas of the world. Reproduced from World Database on Protected Areas (WDPA), UNEP-WCMC, July 2011.

Protected area coverage of the world's biomes

Table 1: Protected area coverage of worlds biomes (in percentage)

Biome	Percentage cover
Tropical and subtropical moist broadleaf forests (TMF)	5.5
Tropical and subtropical dry broadleaf forests (TDF)	5.0
Tropical and subtropical coniferous forests (TCF)	2.5
Temperate broadleaf and mixed forests (TeBF)	3.8
Temperate coniferous forests (TeCF)	8.8
Boreal forests/taiga (BF)	6.2
Tropical and subtropical grasslands, savannas, and shrublands (TG)	5.8
Temperate grasslands, savannas, and shrublands (TeG)	2.0
Flooded grasslands and savannas (FG)	8.8
Montane grasslands and shrublands (MG)	3.8
Tundra (T)	13.8
Mediterranean forests, woodlands, and scrub or Sclerophyll forests (MF)	3.0
Deserts and xeric shrublands (D)	3.8
Mangrove (M)	8.5

Protected areas nepal

Table 2: Protected areas of Nepal

Table 3: Protected areas of Nepal (...continued)

S.N Protected Area	Year Established	Area (sq. km.)	Elevation (m)	Conservation Significance
6 Khaftad	1984	225	1,000-3,276	The Park is famous for medicinal plants. Over 220 species of medicinal plants are found. Wildlife includes barking deer, wild boar, ghoral, Himalayan black bear, yellow-throated marten, rhesus monkey and langur monkey, and around 270 species of birds are found. Vegetation is mainly comprised of grasslands and subtropical, temperate, and sub alpine forests. It is also a famous spiritual site.
7 Bardia	1988	968	152-1,494	Mammals such as Royal Bengal tiger, one-horned rhinoceros, elephant, swamp deer, swamp buck, and reptiles such as gharial, marsh mugger crocodile are the main species. Fauna includes 400 species of birds. Gangetic dolphin is found in the Karnali River. Bengal florican, lesser florican, silver-eared mesia and sarus crane are some of 400 species of birds found in the Park that is dominated by sal forest and savannahs.
8 Makalu Barun	1991	1500	435-8,463	The park is an important habitat for endangered red panda and snow leopard, and 100 species of endangered plants. Above 80 varieties of fish including salmon are reported from the Arun River. Wren babbler and olive ground warbler are some of the 400 species of birds found in the Park. Forest vegetation ranges from sub-tropical forests to sub-alpine and alpine vegetation as the elevation increases. The park is also famous for Rhododendrons, 100 species of orchids.Twenty-five (out of 30 found in Nepal) varieties of rhododendrons, 48 species of orchids, 87 species of medicinal herbs, 48 species of primroses and 86 species of foxtail lilies are reportedly found in the Park.
9 Shivapuri-Nagarjun	2002	159	1,366-2,732	Conservation of watershed that drains the Kathmandu Valley is a major objective. The Park has 100 species of mammals including Himalayan black bear, leopard, barking deer, wild boar, rhesus monkey and langur monkey, 177 species of birds, 102 species of butterflies, 100 species of dragonflies and 100 varieties of mushrooms are reported.
10 Dang	2012	770	1,300-1,600	Protected area for conserving the Dang landscape and its unique flora and fauna.

Table 4: Protected areas of Nepal (...continued)

S.N Protected Area	Year Established	Area (sq. km.)	Elevation (m)	Conservation Significance
1 Shuklaphanta	1976	305	90-270	Major wildlife consists of swamp deer, wild elephant, tiger, several species of deer, leopard, and monkeys. Marsh mugger crocodile, cobra, and python are Common reptiles. Important Bird Area; Sarus crane, swamp francolin, grassowl, warblers, flycatcher, florican are the common birds found in the sub-tropical sal forest and open grasslands.
2 Koshi Tappu (Ramsar Site, 1987)	1976	175	80-100	Wild buffalo and Siberian migratory birds are the main focus of conservation. Vegetation consists of grasslands with patches of scrub and deciduous riverine forests. Many species of mammals (such as wild elephants, wild boar, hog deer, spotted deer, blue bull and barking deer) are found. Important Bird Area; 479 species of birds, and reptiles are found. Gangetic dolphin is found in the Koshi River.
3 Parsa	1984	499	150-815	Wildlife species including wild elephant, tiger, leopard, sloth bear, and gaur; reptiles including king cobra, common cobra, krait, rat snake and python; over 370 species of birds including endangered great hornbill are reported. Natural vegetation consists of tropical and subtropical sal forests. Chir pine, khair, and sissoo trees are found on the hilly parts.
1 Dhorpatan	1987	1325	2,850-7,000	The reserve is famous for blue sheep, which is open for regulated trophy hunting.
1 Annapurna	1992	7629	1,000-8,092	Endemic plants and mountains are the main characteristics. Over 100 species of mammals including blue sheep and endangered snow leopard; 39 species of reptiles; 22 species of amphibians; Important Bird Area (IBA); 474 species of birds including multi-colored pheasant, kokla and blood pheasant are reported. Many species of orchids and rhododendrons are found.

Table 5: Protected areas of Nepal

S.N Protected Area	Year Established	Area (sq. km.)	Elevation (m)	Conservation Significance
2 Kanchanjunga	1997	2035	1,200-8,598	Mammals including endangered snow leopard, Himalayan black bear, musk deer, red blue sheep, rhesus monkey; 252 species of different birds including impeyan pheasant, blue magpie, ashy drongo; 20 indigenous gymnosperms, 15 among Nepal's 23 endemic plants, 30 varieties of rhododendrons and 48 varieties of orchids are reported.
3 Manasula	1998	1663	1,360-8,163	Snow leopard, musk deer and Himalayan Tahr are among the 33 species of mammals in the conservation area. Over 110 species of birds and 1,500-2,000 species of flowering plants are reported.
5 Khairapur	2010	16	120-230	The first organized effort to conserve the endangered blackbuck (<i>Antilope cervicapra</i>) is being carried out here.
6 Api Nampa	2010	1903	539-7,132	Snow leopard, musk deer, clouded leopard, goral, Himalayan black bear and Himalayan brown bear are found in the area.

Framework for reviewing contribution

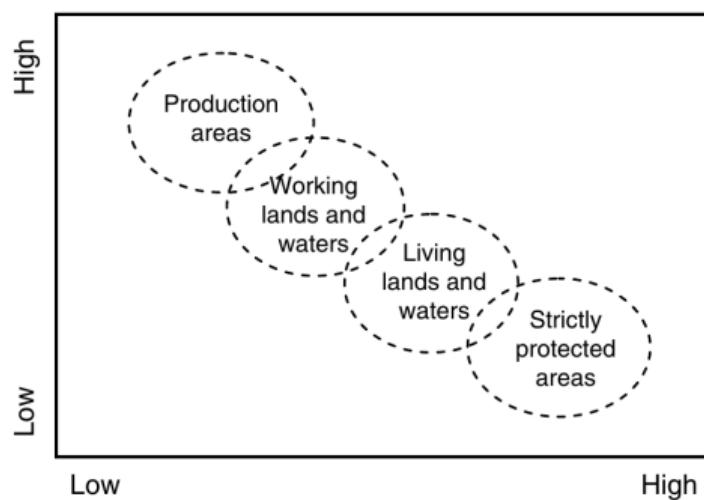


Figure 3: A framework for reviewing the contribution of areas of land and water to biodiversity conservation. Starting at the bottom right hand corner the framework moves from 'strictly protected areas', reflecting the more traditional approach to protected areas managed almost exclusively for biodiversity conservation. The next category is 'living lands and waters', which are areas managed primarily for biodiversity conservation with some extractive uses limited to the ecologically sustainable management of areas of land and water to support life of all forms. 'Working lands and waters' are mostly agricultural lands managed primarily for extractive uses while attempting to conserve biodiversity at the same time. The final category is 'production areas' of land and water where the management focuses exclusively on maximizing extractive and productive uses and biodiversity conservation is not an objective.

Methods of biodiversity conservation

- ① *In situ* conservation;
- ② *Ex situ* conservation
- ③ Restoration

Area-specific/local approach

Farmer as pivot

- Which crop I can cultivate ?
- Which varieties perform good on my locality ?
- Which variety yields better ?
- Which variety can escape disease well ?
- Which crop or crop mixtures are likely to perform well in which season ?
- What seed do I store for the upcoming crop ?
- How do I best manage my land to have a good harvest ?
- How do I best preserve the seed to ensure good planting ?
- How do mix or relay my collection of crops where I grow ?
- How do I preserve the integrity of a good variety ?

Institutional conservation approaches

- Single species based conservation. For e.g. *Ex situ* conservation for single species (e.g., zoos, expensive reintroduction programs, captive breeding programs).
- Umbrella species approach
- Elimination of invasive species linked to conservation failures.
- Protected areas management, for human exclusion.
- Fragmentation and loss of ecosystem management through management of spatial distribution of ecosystem or habitats.
- Incorporation of short-frequency disturbances.
- Limiting or excluding human extraction of resources from nature reserves.
- Reserve design and size allocation based on territory need of each species.
- Use of corridors and buffer zones to link habitat fragments and reserve networks.
- Small-scale, data-intensive species and community model design and implementation.
- Development of nonmarket values for species.

National (Nepal's)/regional approaches

Targeted approach

① Management of protected areas

- A: Improvement in management of protected areas and species.
- B: Abatement in poaching and illegal trade of wildlife and wildlife parts
- C: Improvement in protected area habitats and connectivity
- D: Improvement in management of protected area tourism

② Management of biodiversity outside protected area

- A: Improvement in forest governance and management
- B: Significant reduction (by at least 75% of the current rate) in the loss and degradation of forest
- C: Improvement in conservation of biodiversity in community managed forests
- D: Enhancing conservation of species and genetic diversity
- F: Enhancing forest based livelihoods

Targeted approach (...continued)

- ③ Management of rangeland biodiversity
- ④ Management of watershed biodiversity
- ⑤ Management of agrobiodiversity
- ⑥ Management of mountain biodiversity

Cross-thematic and cross-sectoral strategies

- Addressing the policy and legislative gaps
- Institutional strengthening
- Mainstreaming biodiversity across the government, society and economy
- Harmonization of biodiversity related international conventions
- Enhancement of national capacity for improved management of biodiversity
- Landscape management
- Management of invasive alien species
- Adaptation to and mitigation of the effects of climate change
- Integrating gender and social inclusion perspectives
- Conservation of and Respect to Traditional Knowledge, Innovations and Practices of Indigenous and Local Communities
- Knowledge generation and management
- Technology development, acquisition and use
- Communication, extension and outreach
- Fund generation and mobilization
- Monitoring, evaluation and reporting

Cross sector

Sectoral

International convention and treaties

Intellectual property rights

Bibliography