

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

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- 1 Value of biodiversity
- 2 Biodiversity conservation
- 3 Causes of biodiversity loss
- 4 Risk of extinction and recovery program
- 5 Forms of biodiversity conservation
- 6 Methods of biodiversity conservation

7 Area-specific/local approach

8 National (Nepal's)/regional approaches

9 International convention and treaties

10 Intellectual property rights



Section 1

Value of biodiversity

- Value based on anthropocentric/utilitarian approach and ecocentric approach.
- Utilitarian approach assigns values for
 - aesthetics, and
 - the moral responsibility of humanity to preserve natural resources (thus as indicator of sustainable use of resource)
- Ecocentric approach is concerned with the intrinsic value of biodiversity, meaning its value independent from its contribution to human welfare.
- Direct use value as food and medicines, clothing, energy and shelter; items of direct use value are privately appropriable.
- 80% of the people in developing countries rely on traditional medicine for primary health care needs.
- Indirect use value: ecosystem services and templates for industrial products; Regulatory functions of ecosystem, nutrient recycling, sedimentation processes, waste treatment, water regulation etc.
- Long term or option value: Value in diversity of amount of information, for conservation and natural evolutionary mechanism sustainance.

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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Risk of extinction and recovery program
oooooooooooo

Forms of biodiversity conservation
oooooooooooooooooooo

Methods of b
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Section 2

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 complexity in agrobiodiversity.

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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Risk of extinction and recovery program
oooooooooooo

Forms of biodiversity conservation
oooooooooooooooooooo

Methods of b
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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.

Section 3

Causes of biodiversity loss

Introduction

- It is thought that global biodiversity reached its absolute peak about 30,000 years ago.
- Anthropogenic biodiversity loss is estimated at 100-1000 times higher than the estimated rates for natural extinction process.
- Genetic erosion in *in-situ* conservation; In China diversity of wheat varieties used have decreased 10 times between 1949 and 1970.
- Contamination in regenerating cross-pollinated species.
- Storage conditions and handling in *ex-situ*.
- Restructuring or financial leanness of storage institutions.

Major drivers

- Habitat loss, overexploitation, alien species introductions, building and mechanical constructions, 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



Section 4

Risk of extinction and recovery program

Risk of extinction

- During the last 500 million years, Earth experienced five periods of **mass extinction** when at least half the living creatures were wiped out.
 - Ordovician (445 MYA) – intense ice age – 60-70
 - Devonian (375-360 MYA) – drastic drop in oxygen levels – 75
 - Permian (252 MYA) – Asteriod impacts, intensive volcanic activity – 95
 - Triassic (200 MYA) – Massive volcanic eruptions, asteriods – 70-80
 - Cretaceous (66 MYA) – Asteriod impact – 75



- Occasionally, we should expect to lose many species, whereas over most time periods, only a few species should be expected to be lost.
- Therefore, the greater the disturbance, the greater the effect (reduction) on biodiversity.
- Probability of species loss depend mostly on:
 - Size of the population of species within the community
 - Species with narrow geographic ranges may be more susceptible to extinction
 - Small populations exhibit lower genetic variability
- Fossil records, provides the most direct evidence for tracing temporal changes in biodiversity, including both the origin and extinction of lineages.

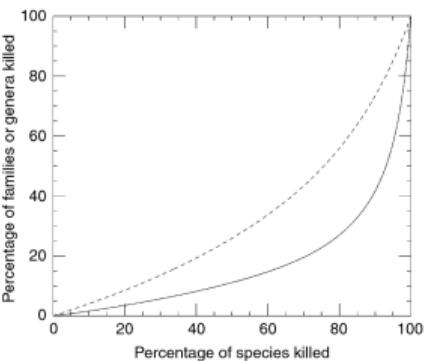


Figure 1: Rarefaction curves for the extinction of families (solid line) and genera (dashed line) calculated for echinoderms by Raup (1979). The curves indicate what percentage of families or genera are expected to become extinct during an event which kills a given percentage of species. Used in reverse, the curves also allow us to estimate what percentage of species became extinct in a particular event, given an observed percentage of family or genus kill.

- It is necessary to evaluate the risk of extinction by determining factors such as the absolute abundance of individuals within species and how this influences the extinction risk.
- Experimental work on laboratory and field communities suggests that decreasing biodiversity also leads to a reduction in ecological time of ecosystem function, such as total productivity and carbon dioxide sequestration.

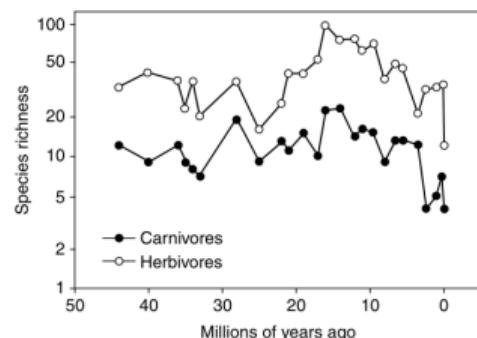


Figure 2: The number of large mammal species from North America during the past 44 million years. Note the correlation between the diversity of predators and their potential prey ($r^2 = 0.43; p < 0.001$)



Figure 3: The convex-billed cowbird (*Pandanaris convexa*) is a species of bird in the family Icteridae, and the only living member of the genus *Pandanaris*, that originally lived in North America during the Pleistocene. Its extinction was associated with the extinction of large herbivores.

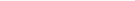
Value of biodiversity

Biodiversity conservation

Causes of biodiversity loss

Risk of extinction and recovery program

Forms of biodiversity conservation



Methods of b oo

Southeast Asia possesses an estimated vascular flora of around 60,000 species (20,000-25,000 species in Indo-China and 42,000 species in Malesia). Of 1371 red-listed plant species in Southeast Asia, 292 are critically endangered, 196 endangered, 737 vulnerable, 31 near-threatened, and 110 data-deficient. Five plant extinctions are documented: two mangos (*Mangifera casturi* Kosterm and *Mangifera rubropetala* Kosterm), two dipterocarp trees (*Dipterocarpus cinereus* Sloot and *Shorea cuspidata* Ashton), and one herb - the "woolly stalked Begonia" (*Begonia eiromischa* Ridl.). Only the mangos survive in ex situ collections (IUCNRedlist.org, accessed 23 August 2011)

Since AD 1500, at least 132 bird species have gone extinct (EX), and a further four are extinct in the wild (EW). Strikingly, 121 (92%) of these species were confined to islands, mostly in the Pacific, and an additional three were confined to single lake (Birdlife International, 2011).

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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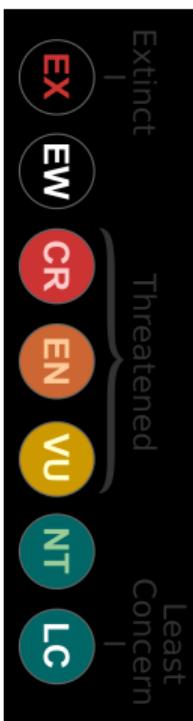
Risk of extinction and recovery program
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Forms of biodiversity conservation
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Methods of b
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Recovery programs

- Endangered species are in the most imminent needs of attention for recovery (species recovery/conservation plan/action).
- A recovery plan describes the current status, threats and intended methods for increasing rare and endangered species.
- The Species Survival Commission's Specialist Groups of the International Union for Conservation of Nature (IUCN) has created Species Action Plans since at least the mid-1980s, which are used to outline the conservation strategies of species, normally between set dates.
- Either a single species or an area, habitat or ecosystem or entire landscape can be targeted by the recovery plan.



Value of biodiversity
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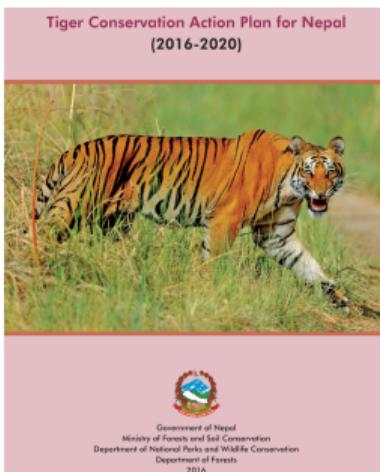
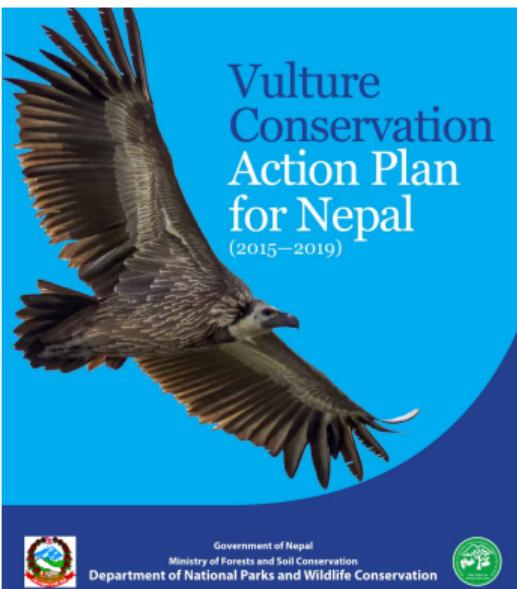
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Causes of biodiversity loss
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Risk of extinction and recovery program
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Forms of biodiversity conservation
oooooooooooooooo

Methods of b
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- Recovery programs are conducted at both coarse-filter and fine-filter approach.
- Coarse filter approach focuses on habitat and most, if not all species, and their ecological functions being supported in reserves and conservation areas.
 - For example in conserving invertebrates (grasshoppers, ants and snail) species, a major consideration is that of effort to restore stone-cover.
- Restoration of grazing in areas where plant succession eliminates savannah-like, open habitats often results in the increase of the species richness of native pollinators and other invertebrates.
- The Lord Howe Island stick insect (*Dryococelus australis*) had been thought to be extinct until a small population was found on a tiny Ball's Pyramid Islet (New 2012); a small fraction of the population has been collected and is now successfully breeding in captivity at Melbourne Zoo.

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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Risk of extinction and recovery program
oooooooo●

Forms of biodiversity conservation
oooooooooooooooo

Methods of b
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- Reintroduction and restocking programs (generally effective for birds) may be employed when a wild population is otherwise beyond recovery.
- These programs are decided based on:
 - organism's ecology
 - current threats
 - suitability of available stock
 - regional human socio-economic implications
- Release should only take place when the habitat is capable of sustaining a viable population and original constraining factors no longer operate.
- Proper recovery programs do not simply act as stop gaps to prevent extinction, but can restore species to a state of health so they are self-sustaining.
- Best plans are adaptive and dynamic, responding to changing conditions.

Section 5

Forms of biodiversity conservation

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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Risk of extinction and recovery program
oooooooooo

Forms of biodiversity conservation
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Methods of b
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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,

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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Risk of extinction and recovery program
oooooooo

Forms of biodiversity conservation
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Methods of b
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- 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

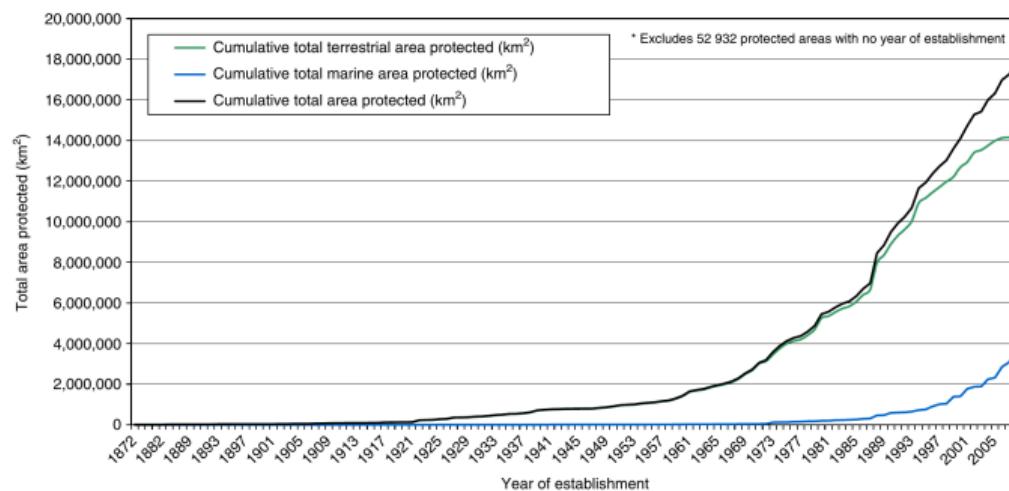


Figure 4: Global growth in protected areas. Reproduced from IUCN and UNEP-WCMC (2009).

Value of biodiversity Biodiversity conservation Causes of biodiversity loss Risk of extinction and recovery program Forms of biodiversity conservation Methods of b
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Figure 5: 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
Temperatre 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

Protected Area	Year Established	Area (sq. km.)	Elevation (m)	Conservation Significance
1 Chitwan (World Heritage Site 1984)	1973	932	150-815	The Park houses over 50 species of mammals including one-horned rhinoceros, Royal Bengal tiger and bison; Important Bird Area; 539 species of birds that include migrant birds like paradise flycatcher, Indian pitta, parakeets and several species of waterfowl; and many species of amphibians and reptiles including the endangered gharial, marsh mugger crocodile and python. The habitat comprises of deciduous broadleaf forest with over 600 plant species, savannas and wetlands.
2 Langtang	1976	1710	792-7,245	The habitat types range from sub-tropical forests below 1,000 m to alpine shrubs and grasslands. Musk deer and red panda are at the focus of conservation. Many other mammals such as snow leopard, wild dog, Himalayan black bear, Himalayan tahr, ghoral, serow, rhesus monkey and langur monkey, and over 370 species of birds including tragopan and impeyan pheasant (danphe) are found.
3 Rara	1976	106	1,800-4,048	Rara has many animal species including endangered red panda and musk deer. Three species of snow trout are found in the lake. During winter over 270 species of birds including coots, great-crested grebe, black-necked grebe, red crested pochard, mallard, common teal, merganser and gulls, and migrant water fowls can be seen. Coniferous forests, primarily of blue pine forms the dominant vegetation. Rhododendron, juniper, spruce, oak and cypress are found around 3,000 m while spruce and fir are more common at higher elevations.
4 Sagarmatha (World Heritage Site 1979)	1976	1148	2,800-8,848	The Park is famous for the scenic beauty of the Himalayas (including Mount Everest), musk deer, red panda, bear and snow leopard. Nearly 200 species of birds including impeyan pheasant, blood pheasant, red-billed chough, yellow-billed chough, snow cock, and snow pigeon are found. The forest vegetation comprises of pine and hemlock forests at lower elevations, and silver fir, birch,

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

Protected Area	Year Established	Area (sq. km.)	Elevation (m)	Conservation Significance
6 Khaptad	1984	225	1,000-3,276	The Park is famous for medicinal plants. Over 220 species of medicinal plants are recorded. 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. This 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, black buck, and reptiles such as gharial, marsh mugger crocodile are the main species. Fresh-water 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 several species of endangered plants. Above 80 varieties of fish including salmon are reported in 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 and orchids.Twenty-five (out of 30 found in Nepal) varieties of rhododendrons, 48 species of orchids, 87 species of medicinal herbs, 48 species o primroses and 86 species of fodder trees 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. Around 19 species of mammals including Himalayan black bear, leopard, barking deer, wild boar, wild cat, rhesus monkey and langur monkey, 177 species of birds, 102 species of butterflies, and 129 varieties of mushrooms are reported.
10 Banke	2010	550	360-480	Conservation of endangered wildlife and strengthening of transboundary biological corridor are some of the main objectives. Includes eight natural ecosystems, and houses 124 species of plants, 34 mammals, more than 300 birds, 24 reptiles, seven amphibians, and 58 fish species



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

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, wild boar, leopard, and monkeys. Marsh mugger crocodile, cobra, and python are Common reptiles. Important Bird Area; Sarus crane, swamp francolin, grassowl, warblers, flycatchers, Bengal 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 other species of mammals (such as wild elephants, wild boar, hog deer, spotted deer, blue bull and jackal); Important Bird Area; 479 species of birds, and reptiles are found. Gangetic dolphins are 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 the endangered great hornbill are reported. Natural vegetation consists of tropical and sub-tropical 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 impeyan pheasant, kokla and blood pheasant are reported. Many species of orchids and rhododendrons are found.

Table 5: Protected areas of Nepal (...continued)

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 panda, blue sheep, rhesus monkey; 252 species of different birds including impeyan pheasant, red-billed blue magpie, ashy drongo; 20 indigenous gymnosperms, 15 among Nepal's 23 endemic flowering 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 found 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>).
6 Api Nampa	2010	1903	539-7,132	Snow leopard, musk deer, clouded leopard, ghoral, Himalayan black bear and Himalayan tahr are found in the area.

Value of biodiversity
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Biodiversity conservation
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Causes of biodiversity loss
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Risk of extinction and recovery program
oooooooo

Forms of biodiversity conservation
oooooooooooo●

Methods of b
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Framework for reviewing contribution

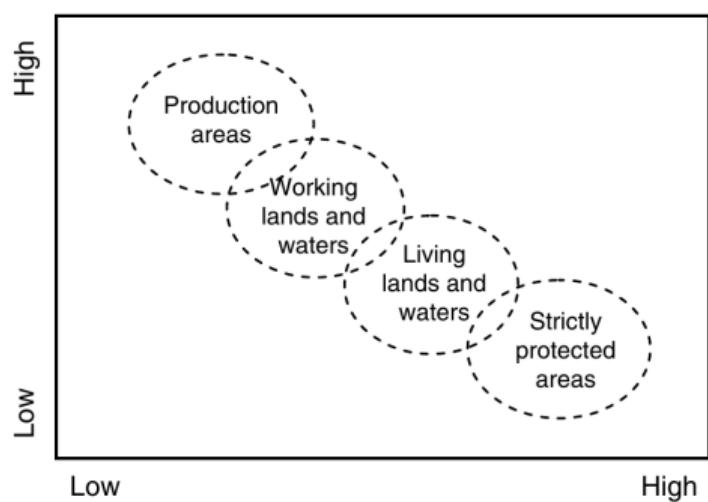


Figure 6: A framework for reviewing the contribution of areas of land and water to biodiversity conservation. Starting at the bottom right hand corner the framework moves from 'strictly protected areas', reflecting the more traditional approach to protected areas managed almost exclusively for biodiversity 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.

Section 6

Methods of biodiversity conservation



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



Section 7

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.



Section 8

National (Nepal's)/regional approaches

Targeted/sectoral 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

Value of biodiversity
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Biodiversity conservation
oooo

Causes of biodiversity loss
ooo

Risk of extinction and recovery program
oooooooooooo

Forms of biodiversity conservation
oooooooooooooooooooo

Methods of b
oo

Targeted/sectoral 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



Cross-thematic (... continued)

- 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



Section 9

International convention and treaties



Section 10

Intellectual property rights

Background

- IP protection consists of principles that a society observes to ensure that an inventor is protected from the unfair use of his/her invention by others.
- Protection is provisioned in the form of:
 - Copyright
 - Patent
 - Trademark
 - Trade secret
 - Breeder's right
 - Confidential information
- Innovation has a price tag, hence the investor must be compensated
- Ensures that invention is not kept secret from betterment of society.
- Law and science meet here.

Guiding treaties, agreements and institutions

- Agreement on Trade related Aspects of Intellectual Property Rights (TRIPS Agreement) within the World Trade Organization (WTO) in 1995 (effective since).
- International Treaty on Plant Genetic Resources for Food and Agriculture in (ITPGRFA) 2002.
- World Intellectual Property Organization (WIPO)
- International Union for the Protection of New Varieties of Plants (Union International pour la Protection des Obtentions Vegetales; UPOV) established in 1961.

Traditional knowledge

- Association between level of biodiversity in a specific region with cultural distinctiveness of its inhabitants.
- Specific knowledge of communities living in close relationship to their environment: traditional knowledge.
- Integrated into
 - Rio Process,
 - International Treaty on PGRFA
 - World Summit on Sustainable Development; Johannesburg, South Africa 26 August - 4 September 2002.
- CBD speaks of 'traditional knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity' (Article 8(j)).

Traditional knowledge

- Foster sharing of economic incentives to making available traditional knowledge, to conserve it through use, and thereby enhance the livelihoods of farming and indigenous communities and reverse the decline of biodiversity, upon which, in return, long-term food security is based. [Biber-Klemm et al., 2006]
- Since the adoption of convention on Biological Diversity (CBD) in 1992, the law of plant genetic resources (PGR) and the legal status of traditional knowledge (TK) has attracted increasing attention.
- 2001 Doha Agenda of the WTO explicitly endorsed the issue of traditional knowledge as a subject for further work.

Traditional knowledge

- TK has common features for both indigenous as well as farming communities:
 - Information is not an individual creation, but the achievement of a specific community.
 - It cumulates over many generations and evolve accordingly.
 - Managed by and exchanged through customs or customary laws.
 - Close interaction exists between TK and the surrounding ecosystem.

Farmer's right

- Intellectual contribution of farmers to the diversity of crop varieties and animal breeds emphasized in 'Farmers' Rights Charter', a document drafted by Indian Farmers' Unions.
- Guiding thoughts:
 - Farmers ought to have the right to 'participate fully in any benefits derived from the improved use of these genetic resources' and, of course, in the ITPGRFA (Preamble para. 7 and Article 9.1).
 - Farmers' innovations take place collectively and cumulatively, and that therefore farmers' rights, arising from their role as conservators and breeders, are community rights.

UPOV

- It seeks to protect new varieties of plants both in the interest of agricultural development and of plant breeders.
- UPOV sought from the outset to provide incentives to the private sector to engage in commercial plant breeding, by introducing so-called plant breeders' rights, aka. Plant Variety Rights.
- Agreed guidelines for the conduct of tests and standardization of variety descriptions based upon the morphology of the grain and plant.
- PBR is an IPR, often described as plant "patent". Breeders can claim royalties on seed sold.
- Once granted, PBR recognizes the exclusive rights of individual plant breeders to produce or reproduce protected varieties, to condition them for the purpose of propagation, to offer them for sale, to commercialize them, including exporting and importing them, and to stock them with a view to production or commercialization (Article 14.1 UPOV).
- Like any patent right, PBR expires after 20 years.

TRIPS

- General Agreement on Tariffs and Trade (GATT) contains important provisions covering the protection of intellectual property in the agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS).
- For most member countries ratification of GATT means membership of UPOV and a PBR system based upon plant morphology.
- Plant breeders will still use morphological characters to purify candidate varieties before submitting them for tests and trials, and seed traders will still use morphological characters to verify variety at the point of sale.
- However, the science of systematics is being revolutionized by molecular technologies.
- Concept of “Essentially derived varieties”



Bibliography |

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