IUCN
The World Conservation Union

The World Conservation Union (IUCN)

India Country Strategy

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Executive summary

Founded in 1948, the World Conservation Union (IUCN) is the world's largest conservation network. It brings together 82 member states, 113 government agencies, more than 850 non-governmental organisations, and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership. Over the years, IUCN has demonstrated its capacity to build knowledge, to facilitate cooperation, to foster collaboration, and to influence both policy and practice. It has grown thematically, has spread out across the globe, and has deepened its engagement at the local, national, regional and global level. The organisation draws its strength from the quality of knowledge it provides to policy makers and practitioners, the composition and credibility of its members, and its democratic, multi-tiered system of governance.

During the last four decades, IUCN has worked together with members and partners in India on a wide range of issues. A series of recent IUCN missions concluded that there is now need for a country programme, led by an office in Delhi. With this, it is expected that the engagement in India will broaden, as well as deepen. The purpose of this document is to define a strategy for IUCN in India, in consultation with members and other stakeholders. The country office, to be set up in 2006, will be responsible for translating this strategy into suitable programmes and actions..

Due to its sheer size, and its range of topography, altitude, and climate, India exhibits a rich variety of ecosystems, including forests, grasslands, deserts, wetlands, mangroves, and coral reefs. These habitats provide for basic needs such as food, fibre, medicine, fodder, fuelwood, and timber of a large section of the Indian population. However, in many parts of the country, there are serious threats to ecosystem health, and consequently, to human livelihoods as well. Based on an analysis of these trends, it is possible to articulate India's conservation priorities in support of environmental sustainability.

This document sets out six conservation priorities, each of which requires specific improvements in knowledge, in capacity, and in governance at the local, sub-national, and national level. These are listed below.

- Enhancing India's cooperation with other countries on issues where national, regional, and global conservation concerns converge
- Influencing mainstream policy and programmes to recognise the trade-offs between social, economic and environmental considerations, and to integrate conservation concerns into the process of decision making
- Employing effective instruments that encourage environmentally sensitive resource use, and discourage unsustainable practices by resource users
- Designing special measures to ensure the survival of fragile ecosystems in different parts of the country

- Promoting community conservation of common pool resources, whether owned by the state, or by local entities
- Managing protected areas, reserved forests, and other habitats controlled by the state in a manner that balances conservation imperatives with local needs, synthesises scientific conservation principles with indigenous knowledge, and provides local communities a long term stake in conservation

Compared to many developing countries, India has a relatively long history of environmental protection by the state. Current national perspectives on key conservation issues are both inclusive, and progressive. The country has impressive national and sub-national research institutions, in the fields of both natural and social sciences. It has a large number of dedicated and capable non-government organisations engaged in research, advocacy, training, communication, and community mobilisation for conservation and development. India must capitalise on these strengths in order to effectively address its conservation priorities. For this it needs local, sub-national, and national level platforms that bring together public and private interests; government and non-government perspectives; social and natural science; science and policy; and policy and practice. At the same time, India also needs to be a part of regional and global platforms to effectively address the convergence of conservation concerns at a higher level. In both respects, IUCN is uniquely positioned to add significant value.

The role of IUCN in India is, therefore, to create national platforms for knowledge, dialogue, and action; and, to link these to regional and global platforms. This will provide opportunities for members to enhance their collective strength, and their collective contribution to national, regional, and global conservation. Through national, regional, and global initiatives, IUCN will support dedicated forums to share knowledge, facilitate collaborative research, design training opportunities, promote select collaborative projects, facilitate policy dialogue, and provide policy support.

IUCN will use its first three years in India to create a strong foundation for the future. It will set up a modest country office, deepen its understanding of national conservation issues, and initiate practical steps to broaden its mandate and to strengthen its constituency. For this, it will need to secure flexible framework finance. Following a review of this phase, IUCN will increase the scope and scale of the country programme consistent with national conservation priorities.

The country programme has five short-term objectives. These are, enhancing India's role in global conservation; mainstreaming conservation in sectoral policy; sustaining fragile transboundary ecosystems; integrating empirical research into policy and practice; and, strengthening IUCN membership in India.

Various considerations have guided the process of framing these objectives. Each finds common ground between India's conservation priorities, and IUCN's conservation priorities in Asia. Views of members have been taken into account. Promising activities undertaken in the past are to be supplemented with new ones. There is scope for national, regional as well as global initiatives. Finally, there are opportunities to involve policy makers, decision makers, social scientists, natural scientists, as well as civil society organizations.

This draft strategy for the IUCN India country programme seeks to tap synergies among the IUCN community in India, in Asia, and in other parts of the world. These synergies will go a long way to strengthen India’s conservation efforts, not only at home, but also abroad.

Contents

1. Introduction

The involvement of the World Conservation Union (IUCN) in India began in the 1960's, even before the government of India became a state member of the Union in 1969. Today, IUCN has 24 members in India, the highest among Asian countries. The six IUCN Commissions include 425 experts from India. Despite not having a secretariat in the country, IUCN has engaged with a large number of government and non-government agencies in a broad sweep of activities over the years.

A series of recent IUCN missions that consulted with Indian members and partners concluded that there is now need for a country programme, led by an office in Delhi that will represent India in the regional and global secretariats of IUCN. With this, it is expected that the IUCN engagement in India will broaden, as well as deepen. The purpose of this document is to define a strategy for the IUCN in India, in consultation with members. The country office, to be set up in 2006, will be responsible for translating this strategy into suitable programmes.

This document draws upon inputs from IUCN member organisations, as well as from IUCN staff. At the outset, members were invited to share their views through an open-ended questionnaire. Their response was incorporated in the first draft of this document. Detailed comments from IUCN staff led to improvement in both structure and content, and a revised draft was circulated in April 2006. This was discussed with members at a one-day workshop in New Delhi on May 1, 2006 (see list of participants in annex 1). Deliberations at the workshop, as well as suggestions that came in subsequently, have helped to shape the final document.

Following this introduction, there are four chapters in the document. Chapter 2 discusses the link between ecosystems and livelihoods in India, and major threats to the environment. It is supported by a brief description of various ecosystems in annex 2. In response to the major environmental threats, chapter 3 identifies priorities for conservation in India. It also breaks these down into specific requirements in terms of knowledge development, capacity building, and improved governance. Chapter 4 presents an overview of IUCN, its global and regional role, and its recent activities in India. This is followed by chapter 5, which outlines the role for IUCN in India, the nature of support, the short-term goal, and finally, the objectives of the country programme during its first three years. Among various other considerations, these objectives are based on the common ground between India's conservation priorities (as argued in chapter 3) and IUCN's conservation priorities in Asia. Thus, the expected results of the IUCN India country programme converge with those of the IUCN Asia regional programme. This convergence is highlighted in annex 3.

2. India: ecosystems and livelihoods

A large section of the Indian population depends on natural resources to meet basic needs such as food, fibre, medicine, fodder, fuelwood, and timber. An estimated 58% of the total work force is engaged in agriculture, and 4% in household industries based on biomass. About 20 million households depend on forests, and another 6 million households on freshwater and marine fisheries. Animal husbandry is the primary occupation of pastoralist communities, and a secondary occupation of agriculturists in most parts of the country. The dependence on natural resources is higher for poorer communities. Of the 260 million people that live below the poverty line, more than 100 million are partially or wholly dependent on forests for survival.[1]

Yet, the relationship of people and nature is not merely extractive. Numerous communities across the country are known to possess knowledge of ethnobiology, of ecological processes, and of ecosystem functions. Such indigenous knowledge, often founded in tradition, is applied to practices that conserve natural resources, for current use, for future use, for coping with environmental uncertainty, as well as for their cultural, religious, and spiritual value.

Due to its sheer size, and its range of topography, altitude, and climate, India exhibits a variety of ecosystems. Classified by habitat, these include forests, grasslands, deserts, wetlands, mangroves, and coral reefs. As seen in annex 2, each ecosystem is characterised by varying patterns of human intervention that impact land, water, and biological resources. Extensive deforestation, for instance, has reduced forest cover to about a fifth of the geographical area. While the magnitude is now relatively stable, the quality of forest cover is far from satisfactory. Despite the fact that grasslands are poorly studied, it is more than evident that they are in a state of degradation. Changes in land use affect desert ecosystems adversely. A host of pressures operate on wetlands and mangroves, and threaten the rich biodiversity that they support. Coral reefs are considered the most productive of marine ecosystems, but are extremely fragile and sensitive to environmental stress. Thus, in many parts of the county there are serious threats to ecosystem health, and consequently, to human livelihoods as well.

In order to understand the nature of such threats in the coming years, it is useful to look at past trends, as well as at present policy direction[2]. A brief analysis is presented below.

2.1 Expansion of agriculture

When India became independent in 1947, the socio-economic situation was dominated by a small class of large land-owners, and a vast mass of impoverished cultivators. In subsequent years, land reforms were enacted, surplus private land was acquired by the state, public land

[1] Ministry of Environment and Forests 2002. ***Empowering People for Sustainable Development.*** MoEF. New Delhi

[2] As represented in: GOI 2001. ***Approach Paper to the Tenth Five Year Plan (2002-07)***; and, ***Tenth Five Year Plan 2002-2007, Volume II- Sectoral Policies and Programmes***. Planning Commission, New Delhi

was distributed on a large scale, and major irrigation projects were high on the development agenda. Public policy was founded on the thesis that farming would lift people out of poverty. This tended to give a certain legitimacy to encroachment on public as well as community land, even though this often favoured the relatively rich, over the relatively poor. This expansion of agriculture, promoted by the state, and furthered by individuals, came mostly at the expense of forests, but also took its toll on grasslands, wetlands, and coastal belts.

The approach paper to the Tenth Five Year Plan (2002-07) states that every effort must be made to bring uncultivated land into productive use, whether by way of agriculture or forestry. However, it accepts that there is now little scope to expand the cultivated area, and hence shifts the emphasis to increasing productivity. India is therefore unlikely to see a large-scale land use change in favour of agriculture.

Nevertheless, the trend of dispersed, localised, small-scale conversion of common pool resources is bound to persist. Legislation now protects the boundaries of forests, but habitats such as scrub land, grasslands, deserts, wetlands, and mangroves remain vulnerable. Such resources are often an important means of survival for the poor, and also provide crucial ecosystem services. Unless placed under well-managed community management at an ecosystem or landscape level, these resources are likely to be wiped out.

2.2 Unsustainable farming practices

In the vast landscape across the subcontinent and the seascape along the coastline, the use of land, water, and biological resources by individuals goes virtually unregulated. The preoccupation with maximising short-term gain often reduces productivity in the long run, and has unforeseen off-site impact as well. In many parts of the country, the practice of agriculture, horticulture, farm forestry, aquaculture, and fishing use scarce land, water, and biological resources intensively or wastefully, and deteriorate their quality.

As of today, the diffusion of environmentally friendly farm technology is limited. Nutrient overloading due to over-application of nitrogenous fertiliser continues unchecked. The persistent use of harmful pesticides introduces pollutants that are a serious risk to human health and to biodiversity. Adoption of techniques for reducing water use, organic agriculture and aquaculture, integrated pest management, and bio-pesticide is confined to only small pockets. This may point to gaps in the design of appropriate technologies, as well as with their promotion. At a larger level, pricing of inputs such as energy, water, and fertiliser encourages unsustainable farming practices. The Tenth Plan resolves to reduce subsidies on these items, however the issue is politically contentious.

A number of critical conservation concerns lie beyond the purview of the individual farmer. These include, for instance, run-off control, checking soil erosion, and protecting both wild and cultivated biodiversity. These require integrated resource management through collective action, something that is urgently called for in the case of fragile ecosystems. Watershed management is one such approach that aims to balance multiple uses to conserve both public and private resources. This is considered a key government priority in rainfed areas, and has been the recipient of increasing financial allocations over the last decade. Success, however, is constrained by weak coordination among various government departments and agencies. Further, conflicting interests of different sections of local communities hamper equitable,

sustainable arrangements. Some non-government organisations have successfully created viable local institutions on an ecosystem, watershed, or landscape basis. Nevertheless, these promising efforts do not seem to find broad based support.

2.3 Rapid urbanisation

As a result of rapid urbanisation over the past five decades, 28% of India's population lived in cities by 2001. This figure is projected to reach 40% by the year 2030[3]. The advancement of urban frontiers pushes back natural habitats, and disrupts hydrological systems. Driven by increasing consumerism, urban lifestyles consume a disproportionate share of scarce water, energy, and raw material. The accumulated strain on infrastructure and civic services is evident in large volumes of waste that is dumped in landfills and of untreated sewage that is emptied into rivers and streams.

The environmental impacts of unplanned and poorly planned urbanisation are obvious across the world. India has already experienced some of these. Their magnitude is certain to grow, both spatially as well as exponentially. A number of programmes have been launched to address issues such as water conservation, waste management, and sanitation. Substantial financial investment is committed for urban renewal across the country. However, in the absence of stringent laws and comprehensive policy support, this could well hasten the process of environmental degradation not just around cities, but also further afield.

2.4 Industrial growth

Economic liberalisation has increased the pace of industrialisation over the past decade and a half. During the period 2002-07, industrial growth is expected to accelerate to 10% per annum. This is likely to have adverse implications for the environment. A number of manufacturing industries are known to present a substantial risk to air and water quality. These include iron and steel, thermal power plants, copper/ zinc/ aluminum smelters, cement, oil refineries, petrochemicals, pesticide, and fertiliser. In addition, hazardous wastes are generated by petrochemical, pharmaceutical, pesticide, dyes, fertilizer, paint, petroleum, asbestos, tannery, and chlor-alkali units.

India has comprehensive laws dealing with air and water pollution and hazardous waste; fairly stringent ambient standards; norms for location of industries; and regulations to protect sensitive areas. A network of institutions monitors the quality of air and water. While it also monitors the environmental performance of industrial units, it is difficult to ensure compliance. Booking of offenders, prosecution rates, and conviction rates remain excessively low. Clean technology, efficient resource use, and pollution control systems tend to be confined to a small section of industrialists. There has been little attempt to complement regulatory systems with economic instruments that provide incentives for self-regulation.

The tourism industry presents a different order of risk to fragile ecosystems. Disposable incomes among the middle and upper class are on the rise, and there is an emerging interest in traveling to pristine locations. At risk are sensitive mountain areas, forests, lakesides, and coastal stretches. High tourist numbers concentrated in brief seasons, increased construction

[3] http://planningcommission.nic.in

to accommodate them, pressure on water resources, and increased sewage and garbage are just some of the resultant pressures. There is an urgent need to promote environmentally sensitive tourism across the country.

It is interesting to note that plans for industrial development are completely silent on the subject of environmental protection. It is therefore left to environmental regulators to impose standards and norms, to monitor environmental performance, and to ensure compliance. In the absence of any internal initiative to adopt environment-friendly goals, industry is thus likely to continue to pose a major risk to ecosystems and ecosystem services, probably at a level much higher than before. It is unlikely that the current levels of industrial and economic growth can be sustained in India unless the challenges of environmental degradation are seriously addressed by both the private and public sectors.

2.5 Public sector projects

After a spate of major river valley projects in the first few decades after Independence, there has been a phase of discernible slow down. The Tenth Plan document points out that potential projects are either more difficult to implement, or environmentally more sensitive. It therefore focuses on completing ongoing schemes rather than initiating new ones. While this provides some relief for forests (against submergence), and freshwater ecosystems (against manipulation), the threat from major irrigation projects is far from over. Currently there is an ongoing debate on an ambitious programme for inter-basin transfer of river waters. If implemented, this will have serious social and environmental costs. The nature and extent of these costs are as yet imperfectly understood.

Infrastructure development is a priority in current economic policy, for which a substantial increase in public and private investment is being sought. The Tenth Plan calls for a concerted effort to tap the large potential for hydro-power, but at the same time cautions on environmental protection and fair resettlement. Oil, gas, and coal production are to be increased. Public sector coal mining in forest areas (including protected areas) has been a bone of contention for long. Plans for the coal sector express the need to resolve this conflict. Private investment is to be sought for port development. Greater attention is to go towards improving the existing road network, rather than expanding it. However, rural roads linking villages will be constructed on a large scale.

Clearly, infrastructure projects, big and small, will continue to pose a major threat to ecosystems, particularly in mountain, forest, and coastal areas. It is encouraging that the language of sectoral plans reflects a concern for environmental impacts. However, whether this goes beyond rhetoric, and actually allows a full consideration of social and environmental costs and benefits, remains to be seen.

2.6 Shrinking commons

Outside the boundaries of privately owned land and water resources, there exist common spaces that are used by local communities, and provide important ecosystem services as well. Such spaces are found in many parts of country, particularly in mountain regions, hill areas, drylands, and coastal belts. They hold forests, grasslands, freshwater bodies, mangroves, and marine fisheries. Some are open access resources, and hence liable to degradation on account

of competitive use. However others are common pool resources, under varying forms of regulation by local communities. These resources, owned either by the state or by communities, exhibit both traditional and modern management systems. According to one estimate, such common land alone accounts for as much as 15% of the geographical area; and as many as 38% of all households have access to common inland water resources.[4] In well-managed common pool resources, communities have secure user, if not property rights, and are able to put in place social and institutional mechanisms for equitable, sustainable use.

A number of non-government organisations have led efforts to bring a variety of open access resources under community conservation; as well as to strengthen prevailing systems of community conservation. In some areas, government programmes have helped to reinforce cooperative arrangements to manage canal and tank irrigation (although groundwater extraction defies control). Yet, in the absence of legal and policy support, these resources remain highly vulnerable to exploitation and appropriation both by individuals and by the state. Usufruct and property rights are often poorly defined, or are insecure. An amendment to wildlife protection laws seeks to address part of this issue, but falls short of requirements. There are also instances where community management systems are weakened by external pressures, internal dissent, domination by elites, and lack of knowledge. Finally, the application of scientific conservation principles, particularly relating to regulating and supporting services of ecosystems, is limited. Common pool resources are thus liable to degradation and decimation.

2.7 Limitations of state conservation

The premise that all human activity is inherently damaging, originally prompted the state to assume full responsibility for conservation. Thus protected areas, forest reserves, and other state-controlled territories were created to keep people out, often abrogating traditional community rights in an arbitrary manner. Nevertheless, it has been difficult to enforce human exclusion, and some degree of local use continues through both 'legitimate' and 'illegitimate' means in most areas. Conservation literature in India cites the prevalence of over-cultivation, over-extraction of medicinal plants, over-hunting, over-grazing, over-fishing, and destructive harvesting practices in habitats controlled by the state. In the absence of local support, authorities find it difficult to eliminate organised poaching of endangered species and to arrest illegal wildlife trade. At the same time, human-wildlife conflict is being witnessed at a number of locations, causing serious damage to life, crops, and property. This is often an outcome of displacement of people, of wildlife, or of both. Clearly, this model of conservation is ridden with confrontation, often of violent dimensions.

However, exclusion is giving way to accommodation, as public policy increasingly attempts to include local communities in the conservation agenda. A bill that recognises traditional rights among a select section of forest dwellers, and assigns them specific responsibility for conservation currently awaits enactment. Rights to non-timber forest products have been entrusted to village councils in tribal areas. The concept of joint forest management has been put into practice on a large scale. Eco-development programmes are attempting to change the relationship between protected area managers and local communities. These relatively new initiatives seek to provide usufruct rights to local communities, as well as to involve them in

[4] National Sample Survey Organisation. 1999. ***Common Property Resources in India***. Government of India.

resource management. However, institutional measures that create a long-term stake for community participation are as yet limited.

Community participation can certainly make for more sustainable provisioning and cultural services of ecosystems. However, this alone will not safeguard regulating and supporting services. Hence, it is vital to combine community concerns with scientific conservation principles that are grounded in sound empirical research. Unfortunately, empirical studies of the impact of human activity on ecosystems and ecosystem services are generally lacking.

2.8 Natural disasters

Natural disasters in India are known for their frequency and intensity, as well as for often being exacerbated by environmentally insensitive development. Its sub-continental dimensions, geographical position, and monsoon behaviour make the country susceptible to cyclones, droughts, floods, earthquakes, landslides, avalanches and bush fires. The entire 5,700 km coastline is prone to cyclones. In 1999 over 10,000 people were killed in the Orissa super-cyclone, and around 15 million people were rendered homeless. About 1.8 mha of agricultural land was affected, and more than 90 million trees were uprooted. More recently, in the 2004 tsunami, 12,405 people lost their lives, about 32,000 livestock were wiped out, and over 83,000 boats were damaged. In addition, mangroves, coral reefs, forests, and coastal wetlands were adversely affected.[5]

Drought is a recurrent phenomenon in the arid and semi-arid parts of western and central India. Scarcity of drinking water, food and fodder; crop failure, livestock mortality, and large-scale distress migration are recurrent events. Eight major river valleys are vulnerable to floods. These are virtually an annual feature in the Brahmaputra valley and lower Ganga basin. As much as 56% of the total area of the country is susceptible to seismic disturbance, the Himalayan belt and northwestern Gujarat being the most sensitive.[6] The 2001 earthquake in Gujarat took an estimated 20,000 lives, and destroyed over half a million homes.[7] Landslides are common in the sub-Himalayan region and the western Ghats. Avalanches take place in many parts of the Himalayas, while bush fires occur in parts of east and north-east India.

India possesses systems to monitor climatic phenomena, technologies to mitigate human impact, and expertise in relief and rehabilitation. However, far more needs to be done to understand the ecological impact of natural disasters, to design strategies for ecologically sound restoration and to enhance the resilience of local communities to better cope with natural disasters.

2.9 Anthropogenic climate change

According to recent reports, climate change has already had a significant impact on ecosystems. By the end of the twenty first century it could become the dominant driver of biodiversity loss, and changes in ecosystem services worldwide. Water availability and quality are projected to deteriorate in many arid and semiarid regions. The risk of drought and

[5] http://ndmindia.nic.in
[6] UNEP 2001. ***State of the Environment- India, 2001.*** UNEP. Thailand
[7] http://ndmindia.nic.in

flood is expected to increase. In some parts, the reliability of hydropower and biomass production is likely to decrease. The incidence of vector-borne diseases (such as malaria and dengue) and water-borne diseases (such as cholera) may rise in several countries, as might heat stress mortality, nutritional deficiency, and severe weather traumatic injury and death. Tropical and subtropical regions may witness a fall in agricultural and aquaculture productivity.

India needs to examine the implications of such projections, and to put in place multi-sectoral strategies to mitigate adverse impacts. At the same time, it needs to work together with other countries towards global action to address the causes of climate change.

3. Priorities in conservation

Based on the issues discussed in the previous chapter, this chapter sets out six conservation priorities, each of which is intrinsically linked to livelihoods in India. The first deals with international cooperation on the environment. While the second concerns mainstream policy, the third priority addresses the practices employed by multiple resource users. The remaining three focus on fragile ecosystems, common pool resources, and protected areas respectively; these are conceptually similar, but vary in context, scope, and form. Each priority requires specific improvements in knowledge, in capacity, and in governance at the local, sub-national, and national level.

3.1 Enhancing international cooperation

Many of the environmental threats in India are common to a number of countries. For instance, India and its neighbours share mountain ranges, deserts, rivers, and oceans, and the problems associated with them. Wildlife trade routes cut across borders and traverse the world. Many countries are struggling to cope with fallout of urbanisation and industrialisation. Clearly, such shared problems call for shared solutions.

Deeper analysis would show that several environmental threats in India (or indeed in any country) are not just national in character, but also have international dimensions. The global energy market, for instance, influences the energy choices available to the Indian state. The terms of world trade in agricultural commodities influence the livelihood of the Indian farmer. The emission of harmful greenhouse gases anywhere in the world increases the risk of climate change for all. Thus, India needs to ensure that its national conservation priorities find a place in the regional and global conservation agenda.

Just as India is affected by the actions of countries in its neighbourhood and beyond, its own actions affect other countries as well. By virtue of its size, location, and influence, India leaves a large ecological footprint in Asia. It must, therefore, recognise its responsibility to promote conservation not merely at home, but also abroad. Today the country is emerging as a major player in the regional and global economy. It must work towards a major role in regional and global conservation as well.

Box 1: Requirements in international cooperation

Developing knowledge
- Nature of sub-regional, regional, and global environmental threats
- Social and environmental impact of international development choices on India
- Social and environmental impact of India's development choices on other countries

Building capacity
- Bilateral and multilateral cooperation in areas of mutual concern, by national and sub-national agencies

Improving governance
- Equitable and effective arrangements for environmental conservation at the regional and global level

3.2 Mainstreaming conservation in sectoral policy

Competing demands on natural resources inevitably lead to tradeoffs between beneficiaries, as well as between short term and long-term benefits. However, the full social and environmental costs of these trade-offs may not even be understood, let alone accounted for in decision-making. Many threats to ecosystems and ecosystem services come from sectoral policies that are environmentally insensitive. As seen in chapter 2, the sectors in question include agriculture, aquaculture, irrigation, urban development, manufacturing industry, tourism, power, and communications.

Environmental concerns must be mainstreamed into sectoral policies and programmes. Strategic environmental assessment (SEA) provides an analytical framework to do so. This process attempts to achieve consistency across sectors, especially where trade-offs are called for. It has the added advantage of providing a mechanism for public engagement at the strategic level. While some countries have formal or informal systems for SEA, these are yet to be introduced in India.

Environmental economics is a field that offers various tools to help integrate complex environmental issues into development policy. Valuation of natural resources such as land, water and biodiversity is a well-known concept. Valuing the costs of environmental risks, and the benefits of environmental opportunities must be factored into decision-making. Ultimately, these values must also be reflected in national income accounts. While a fair amount of research on valuation models and methods is taking place in India, this needs to find a place in national and sub-national policy.

Box 2: Requirements in mainstream policy

Developing knowledge
- Concepts, tools, and methods of strategic environmental assessment (SEA) of policies, plans, and programmes
- Valuation of ecosystem goods and services
- Valuation of social and environmental impact of economic and sectoral policies, plans and programmes

Building capacity
- National and sub-national capacity to utilise SEA frameworks to design sectoral policies, plans, and programmes
- National and sub-national capacity to utilise valuation tools in decision making

Improving governance
- Adoption of SEA frameworks by national and sub-national governments
- Integrating the value of ecosystem goods and services services, and impacts in decision-making processes at the national and sub-national level
- Reflecting the value of natural resources in national income accounts

3.3 Influencing resource use practices

Land, water, and biological resources are utilised by multiple entities. These include public sector agencies, private industry, farming and fishing communities, and individual households. While national and sub-national policy may well advocate environmental

protection, there is a need for effective instruments that encourage sustainable use, and discourage unsustainable practice.

As a first step, information and knowledge about environmental impacts need to be shared with resource users, whether in the domestic, agriculture, industry, or infrastructure sector. Each of these sectors offers opportunities for environmentally friendly technology that is less resource intensive, uses resources efficiently, and does not lead to excessive pollution.

Existing regulations for environmental protection have scope for greater compliance. Environmental Impact Assessment (EIA) has been mandatory for certain categories of public and private sector projects for over ten years. However it is yet to become a credible and effective instrument. Similarly, much needs to be done to improve the enforcement of wildlife protection laws, and pollution control laws. While these regulations are vital, economic instruments such as rational resource pricing, fees, tax breaks, permits and bonds must also be used to influence user behaviour.

Box 3: Requirements in resource use practices

Developing knowledge
- Environmentally friendly technologies for domestic, agriculture, industry, and infrastructure sectors
- Techniques of environmental assessment, and models to predict environmental impact
- Methods of social impact assessment, including public hearings
- Measures to minimise social and environmental risks, and mitigate adverse impact
- Economic instruments to promote environmentally friendly technology in domestic, agriculture, industry, and infrastructure sectors
- Poaching channels and trade routes

Building capacity
- Environmental education of multiple resource users
- EIA concepts, knowledge and skills in EIA professionals
- Adoption of environmentally friendly technologies by users in domestic, agriculture, industry, and infrastructure sectors
- Monitoring environmental quality by local authorities
- Monitoring environmental performance of polluting/ hazardous industry by local authorities
- Enforcement of environmental (including wildlife) protection laws, and prosecution of offences by local authorities

Improving governance
- Effective use of EIA by public sector and private sector
- Progressively updating EIA procedures
- Adoption of sound corporate environmental and social responsibility frameworks
- Adoption of economic instruments for environmental protection by national and sub-national governments

3.4 Sustaining fragile ecosystems

Mainstreaming conservation should contain a wide spectrum of environmental threats. Yet, there is a need for an independent focus on fragile ecosystems. Characterised by unique features and providing vital services, these ecosystems are highly sensitive, and at risk of collapse from even minor environmental change, whether manmade or natural. In various

parts of the country, mountain areas, forests, grassland, desert, wetlands, mangroves and coral reefs need special measures to ensure their survival.

Box 4: Requirements in fragile ecosystems

Developing knowledge
- Surveys, inventories, and mapping of fragile ecosystems
- Basic empirical ecological research (including on the magnitude, patterns, and rate of biodiversity loss)
- Empirical research on the ecological impact of human activity (using indigenous knowledge/ multi-disciplinary/ interdisciplinary approaches)
- Ecological impact of natural disasters, and mitigation strategies
- Projected impact of climate change, and mitigation strategies

Building capacity
- Integrated resource management by local authorities, and community organisations
- Mitigating the impact of natural disasters by local authorities and communities

Improving governance
- Legal recognition of community organisations managing natural resources
- Ecosystem-specific policies and regulations that integrate empirical research findings

3.5 Promoting community conservation

Common pool resources continue to serve a range of ecosystem services, despite the multiple pressures on them. Community conservation needs to be recognised and promoted as a viable system of management. The steady trend of privatisation and conversion needs to be reversed. A sizeable extent of open access resources would be best brought under common property regimes. Internal management systems need to be strengthened. Finally, scientific conservation principles should inform community management practices.

Box 5: Requirements in community conservation

Developing knowledge
- Basic empirical ecological research (including the magnitude, patterns, and rate of biodiversity loss)
- Empirical research on the ecological impact of human activity (using indigenous knowledge/ multi-disciplinary/ interdisciplinary approaches)
- Methods to improve local livelihoods, including value addition through biomass-based enterprises
- Social and institutional approaches to common pool resource management

Building capacity
- Knowledge and skills of local communities in scientific conservation principles
- Strengthening social and institutional management of community organisations
- Improving livelihoods, including value addition to biomass-based enterprises by local communities

Improving governance
- Legal recognition of community usufruct and property rights
- Policy support for community conservation

3.6 Participatory management of protected areas

There are three main challenges in conserving protected areas, reserved forests, and other habitats controlled by the state. First, to balance conservation imperatives with local needs; second, to synthesise scientific conservation principles with indigenous knowledge; and third, to create a long-term stake for community participation in conservation. Progressive public policy takes on these challenges through programmes such as ecodevelopment, and joint forest management. However enormous work needs to be done on the ground to translate these programmes into better conservation, and better livelihoods on a long-term basis.

Each protected area must spell out its objectives in terms of biodiversity value, and in terms of local livelihoods. Empirical research on basic ecology, and on ecological impacts of human activity are required at each location. Such research should meaningfully integrate interdisciplinary and multidisciplinary study with indigenous knowledge systems. Empirical findings must find a place in the management plan of each protected area. Institutional mechanisms are essential for dialogue with local communities, for resolving conflict, and for sharing responsibility for conservation. In turn, communities require support for a better quality of life, more remunerative biomass-based livelihoods, and opportunities for alternative livelihoods.

Box 6: Requirements in protected areas

Developing knowledge
- Surveys, inventories and mapping of protected areas, reserved forests, and other state-controlled habitats
- Basic empirical ecological research (including the magnitude, patterns, and rate of biodiversity loss)
- Empirical research on the ecological impact of human activity (using indigenous knowledge/ multi-disciplinary/ interdisciplinary approaches)
- Methods to improve the quality of life of local communities
- Methods to improve local livelihoods (biomass-based and others)
- Effective approaches to participatory management
- Poaching channels and trade routes

Building capacity
- Monitoring changes in habitat and species by managers
- Incorporating empirical research into decision-making by managers
- Creating effective local institutions for participatory management
- Resolution of conflict between managers and local communities
- Improving the quality of life of local communities
- Improving livelihoods (biomass based and others) by managers and local communities
- Enforcement of wildlife protection laws, and prosecution of offences by managers

Improving governance systems
- Integrating empirical research into management plans
- Legal recognition of local institutions for participatory management
- Stronger legal provisions to prevent de-notification of protected areas
- A more representative system of protected areas
- Enhancement of concepts of linked conservation corridors

4. The World Conservation Union (IUCN)

Founded in 1948, the World Conservation Union (IUCN) is the world's largest conservation network. It brings together 82 member states, 113 government agencies, more than 850 non-governmental organisations, and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership.

The Union's mission is to influence, encourage, and assist societies throughout the world to conserve the integrity and diversity of nature, ensuring that the use of natural resources is equitable and ecologically sustainable. It strives to improve the scientific understanding of what natural ecosystems provide to humans. At the same time, the Union also seeks to ensure that this knowledge is used in practical ways, by bringing together policy makers, scientists, non government organisations, and business leaders to impact the way the world values and uses nature. In other words, IUCN combines knowledge, dialogue, and action for conservation at the local, national, regional, and global level.

The Union's databases, assessments, guidelines, and case studies prepared by its global membership, commissions, and secretariat are among the world's most respected and frequently cited sources of knowledge on the environment. The IUCN Red List of Threatened Species is one of its best-known contributions. The World Parks Congress in 2003 is considered a landmark in the debate on protected areas. The World Conservation Congress, held every four years (the last in November 2004 at Bangkok), provides a unique opportunity for democratic debate and dialogue on issues related to conservation and sustainable development. IUCN is also a partner in a number of global initiatives, including the Millennium Ecosystem Assessment.

In the policy arena, the IUCN assists governments, UN organisations, other groupings such as the G8 and G77, and international conventions in sound environmental conservation and management. It assesses all new sites nominated for natural World Heritage Site listing. The IUCN has the official status of observer at the United Nations General Assembly. It has helped over 75 countries to prepare and implement national conservation and biodiversity strategies.

The Union applies sound ecosystem management to conserve biodiversity, and to build sustainable livelihoods for those directly dependent on natural resources. It is, for instance, currently working with 80 partners in a five-year global action plan in 10 water basins. It is preparing guidelines for fire prevention and community management of forest resources. It is also working with the corporate sector on issues of energy and biodiversity, and of mining and protected areas. The priority of the Union's current programme (2005–2008) is to build recognition of the many ways in which human lives and livelihoods, especially of the poor, depend on the sustainable management of natural resources.

4.1 Sources of strength

Over the years, IUCN has demonstrated its capacity to build knowledge, to facilitate cooperation, to foster collaboration, and to influence both policy and practice. It has grown thematically, has spread out across the globe, and has deepened its engagement at the local, national, regional and global level. The organisation draws its strength from the quality of knowledge it provides to policy makers and practitioners, the composition and credibility of its members, and its democratic, multi-tiered system of governance.

There are six IUCN Commissions of scientists and experts, together engaged in cutting edge conservation science. The Commission on Species Survival deals with technical aspects of species conservation and mobilises action for endangered species (over 7000 members). The Commission on Protected Areas promotes the establishment and effective management of a worldwide representative network of terrestrial and marine protected areas (1300 members). The Commission on Environmental Law develops new legal concepts and instruments and builds capacity for application of environmental law (800 members). The Commission on Education and Communication aims to empower and educate stakeholders for the sustainable use of natural resources (600 members). The Commission on Environmental, Economic and Social Policy provides expertise and policy advice on economic and social aspects in the conservation and sustainable use of biological diversity (500 members). Finally, the Commission on Ecosystem Management promotes integrated approaches to the management of natural as well as modified ecosystems (400 members).

Although the priorities of the commissions are set by the World Conservation Congress, these entities have the necessary autonomy to pursue their respective areas of inquiry. Their chairpersons are on the IUCN governing body, and thus help to incorporate a scientific outlook into the organisational agenda. The commissions also assist in the Union's programmes. This mechanism is designed to integrate policy makers, and practitioners in the process of knowledge building, as well to seek opportunities to apply this knowledge.

The IUCN is a union of its members, together constituting a vast network of diverse organisations across the world. Membership is sought by both government agencies and civil society organisations on a purely voluntary basis. This mix ensures that the Union represents multiple rather than singular perspectives. It also provides platforms for its members to come together at the national, regional and global level. This creates opportunities for pooling knowledge and experience, for dialogue, and for working together towards common goals. Through the IUCN, members become part of a collective voice on conservation issues.

The World Conservation Congress is the principal authority of the IUCN. Every four years it elects a governing council. The council is made up of 32 members, consisting of the president, treasurer, three representatives from each of the Union's eight regions, and the chairs of the six commissions. An additional six councilors may also be appointed. The council functions in a similar way to a board of directors, meeting once or twice a year to direct policy, to approve finances, and to decide on strategy. Every four years, the IUCN programme is approved by members at the World Conservation Congress. The democratic structure of the organisation thus gives equal opportunities to all members to help shape its agenda, both via the congress, and via the council.

At the functional level, members are organised into regional, sub-regional, and national committees. This system ensures that the concerns of members are reflected in national

programmes, as well as in regional programmes. It also facilitates coordination and cooperation and coordination among members. By design, each national committee includes both government and non-government organisations, hence allowing for a balance of power. The country office provides independent, non-partisan support to the national committee.

The secretariat forms the backbone of the IUCN. Led by a Director General, it has a strength of over 1000 people drawn from different disciplines. The head office is in Switzerland, and employs about 100 people. The remaining staff work in regional, country, and project offices in 62 countries across Africa, the Americas, Asia, Europe, and Oceania. Activities of the IUCN are implemented through partnerships between members, partners, commissions, and the secretariat.

4.2 IUCN in Asia

Established in 2000, the Asia programme is the largest of IUCN's regional programmes. The Union has 157 members in 19 of the 23 countries in Asia, representing 12% of the global membership. The highest number of members is found in India and Pakistan, at 24 each. Members are organised into National Committees in Bangladesh, India, Japan, Nepal, Pakistan, South Korea, and Sri Lanka. About 1,800 Asian experts are members of the six IUCN Commissions, of which India contributes about 425 members. The IUCN secretariat has country offices in eight countries, *viz.*, Bangladesh, China, Lao PDR, Nepal, Pakistan, Sri Lanka, Thailand, and Vietnam.

Asian ecosystems support more than half the world's population and biodiversity, but are far from being managed in an equitable, sustainable manner. Environmental problems include loss, degradation and modification of key ecosystems and habitats; over-exploitation of resources, especially of wild populations with high commercial or subsistence values; soil and land degradation; freshwater depletion and water pollution; depletion of freshwater fisheries and coastal and marine resources; air pollution; and loss and replacement of native and endemic species and agro-biodiversity. Poverty and livelihoods are directly related to these problems. The challenge before IUCN in Asia is to help reduce poverty without destroying the very resources that have supported the region's development for several millennia. This puts the ecosystems and livelihoods approach at the centre of the Union's role in Asia.

In keeping with the mission of the Union, the twin goals of the Asia programme are that landscapes, ecosystems, habitats, and species are conserved and rehabilitated; and, that natural resources are used and managed on an equitable and sustainable basis within and among nations, communities, and gender groups.

The objectives of the Asia programme are:

- Improved knowledge about landscapes and ecosystems in Asia, and the social and economic aspects related to their conservation and sustainable use
- Enhanced participation of Asian stakeholders in international arrangements and processes that promote and support effective, efficient, and equitable biodiversity conservation
- Ecosystem uses in Asia are increasingly sustainable, and managed to reconcile social, economic, and environmental aims

The Asia Regional Office is located in Bangkok, headed by a Regional Director. In addition to overall direction, this office provides coordination services, membership services, corporate services, and technical support to thematic and country programmes. Thematically, there are two clusters of regional programmes, or Ecosystems and Livelihoods Groups. One is based in Bangkok, and deals with forests, water and wetlands; environmental law; and protected areas. The other is based in Colombo and oversees species conservation; environmental economics; and coastal and marine programmes. In addition, the regional emerging programme is housed in the Pakistan country office.

In a short span of time, IUCN Asia has acquired the experience of working with member countries on regional as well as transboundary issues. For example, the Mekong Wetlands Biodiversity Programme is jointly implemented with Cambodia, Lao PDR, Thailand, and Vietnam. IUCN Asia is to be a partner in the ADB Core Environment Programme for the Greater Mekong Subregion, and to provide the secretariat for its Technical Advisory Panel. The Decision Support System for Hindukush-Karakorum-Himalayas programme involves protected area managers in Nepal, Pakistan and Tibet SAR of China.

4.3 IUCN in India

India has a long history of association with IUCN since the 1960s, beginning even before the Government of India became a state member in 1969. IUCN's tenth General Assembly was held in New Delhi. In 1984, noted agricultural scientist, Dr MS Swaminathan, was elected President of the IUCN. As mentioned earlier, as many as 425 Indians serve in a voluntary capacity on IUCN Commissions, 320 of whom are members of the Species Survival Commission. Together with Pakistan, India has the highest membership of the IUCN, numbering 24. In November 2004, the Government of India and IUCN signed a memorandum of understanding that accords IUCN in India the status of an autonomous, international, non-profit organisation.

The Ministry of Environment and Forests is the state member in India, and the member government agencies are the Attappaddy Hills Area Development Society, G.B. Pant Institute of Himalayan Environment and Development, Indian Institute of Forest Management, National Board for Wildlife, and the Wildlife Institute of India. In addition, there are 16 non government organisations, including the 120-year old Bombay Natural History Society, the largest entity of its kind in the Indian subcontinent.

Recent IUCN activities with members and partners in India include the following:

- IUCN Asia worked with the Ministry of Environment and Forests on Project Tiger, to undertake an independent review of tiger reserve assessment reports, and provide technical assistance to improve tiger census methodologies
- The Regional Marine Programme partnered the Centre for Earth Science Studies in Thiruvananthapuram, Kerala, on the ADB-supported regional project to identify coastal high priority areas for introducing integrated management approaches with special emphasis on improving livelihoods of poor coastal communities
- The Regional Environmental Law Programme undertook a study on the access to legal resources to enforce already created norms, and the role of NGOs in legal systems
- Scoping for Himalayan Region Water and Nature Initiative (WANI).

- The Regional Biodiversity Programme (now restructured as a Regional Species Conservation Programme) worked closely with the MS Swaminathan Research Foundation in Chennai, on several activities pertaining to the implementation of the Convention on Biological Diversity. In 2005, it held a workshop in New Delhi, on like-minded mega-biodiversity countries, with UNDP, BMZ (Germany) and the Government of India. The same year it organised a regional training workshop on bio-prospecting and access and benefit sharing for South Asia, in partnership with US State Department, National Botanical Research Institute, and the Government of India
- IUCN Sri Lanka interacted with the Foundation for Revitalisation of Local Health Traditions, Bangalore, on conservation of medicinal plants. It interacted with the Aryawaidyashala in Kottakal for capacity building of personnel in the Sri Lanka Department in *Ayurveda.* It also facilitated capacity building of communities from different parts of Sri Lanka by arranging familiarisation tours to community co-managed forest reserves in Andhra Pradesh, in collaboration with the Andhra Pradesh Forest Department

In the past, activities such as the above have essentially been sporadic, discrete, and dispersed. The purpose of this paper is to provide a strategic focus for the future.

5. Strategy for IUCN in India

Compared to many developing countries, India has a relatively long history of environmental protection by the state. Current national perspectives on key conservation issues are both inclusive, and progressive. The country has impressive national and sub-national research institutions, in the fields of both natural sciences and social sciences. It has a large number of dedicated and capable non-government organisations engaged in research, advocacy, training, communication, and community mobilisation for conservation and development.

IUCN is uniquely positioned to build on these strengths and to add significant value to India's conservation efforts at home as well as abroad. This chapter describes the future role of IUCN in India, and outlines the nature of support it will offer. It also defines objectives for the first three years of the country programme.

5.1 Role

Institutional processes that engage multiple stakeholders are critical for effective conservation. IUCN has an established record of creating platforms for knowledge, dialogue, and action at the national, regional, and global level. It uses the combined resources of its international commissions, its membership, and its secretariat to enable these forums to influence both policy and practice. Its future role in India is, therefore, to create national platforms for knowledge, dialogue, and action; and, to link them to regional and global platforms. This role is rationalised below.

In order to effectively address its conservation priorities, India needs local, sub-national, and national level platforms that bring together public and private interests; government and non-government perspectives; social and natural science; science and policy; and policy and practice. IUCN has a long track record of facilitating such platforms in many countries. Its members and partners reflect the broad spectrum of stakeholders in conservation. Its reputation as a widely respected, knowledgeable, and influential organisation is a unifying force for disparate entities. The fact that it is autonomous, and non-partisan sets the ground for constructive dialogue and collaborative action. Thus, IUCN can provide opportunities for Indian members and partners to enhance their collective strength, and their collective contribution to national conservation.

At the same time, India also needs to be a part of regional and global platforms to effectively address the convergence of conservation concerns at a higher level. IUCN's Asian and global platforms are well established. They are instrumental in improving international understanding of complex issues, in facilitating international cooperation, and in influencing multilateral environmental agreements. By linking national platforms to regional and global ones, IUCN puts in place an institutional mechanism that integrates multiple interests within each level and between levels. Again, its autonomy and non-partisanship, as well as its democratic norms of functioning cater to equitable participation by country membership. By coming together, IUCN members and partners become a part of the Union's vast resource of global knowledge, and its powerful machinery of global influence. Clearly, links with

IUCN's regional and global platforms can enable Indian members and partners to enhance their collective strength and their collective contribution to national, regional, and global conservation.

5.2 Nature of support

IUCN will support Indian members and partners through national, regional, and global platforms for conservation. This includes the range of options listed below.

Improving knowledge

- Dedicated forums to share knowledge among Indian members and partners
- Dedicated forums to share knowledge among national, regional, and global members and partners
- Facilitating collaborative research by Indian members and partners
- Facilitating collaborative research by national, regional, and global partners

Improving capacity

- Designing training opportunities for Indian members and partners
- Technical assistance for projects implemented by Indian members and partners
- Promoting select collaborative projects implemented by Indian members and partners
- Promoting select collaborative projects implemented by national, regional, and global members and partners

Improving governance

- Facilitating policy dialogue between Indian members and partners at the sub-national, and national level
- Facilitating policy dialogue between national, regional, and global members and partners
- Providing relevant, information, documentation, analysis, facilitation, and coordination for policy dialogue

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5.3 Short term goal

IUCN will use its first three years in India to create a strong foundation for the future. It will set up a modest country office and deepen its understanding of national conservation issues, and efforts being made to address them. During this period, it will initiate practical steps to broaden its mandate and to strengthen its constituency. Following a review of this phase, IUCN will increase the scope and scale of its country programme consistent with national conservation priorities.

Clearly, the initial phase requires flexible framework finance for time and staff resources dedicated to strategic programme development and membership support. It also requires programme support for specific initiatives proposed by the country office. IUCN needs to secure both kinds of financing to sustain its presence in India.

5.4 Country programme objectives

This section defines objectives for the first three years of IUCN's presence in India. These will be translated into specific national, regional, and global programmes by the country office in consultation with members. In the light of experience gained during the period, it may be necessary to refine the choice of objectives, or the manner in which they are framed. A review at the end of this phase will provide the basis for setting future objectives, and for planning future programmes.

The following considerations went into the choice of objectives:

- National conservation priorities (as argued in chapter 3) that are expected to yield the kind of results envisaged under the IUCN Asia regional programme (see Annex 3)
- Views of members
- Taking promising past activities forward, but also allowing for strategic, new initiatives
- Creating scope for national, regional, as well as global initiatives
- Creating scope to involve policy makers, decision makers, social scientists and natural scientists, as well as civil society organisations

5.41 Enhancing India's role in international environmental agreements

India is signatory to a number of multilateral conventions and agreements on environmental issues of global concern. Whether dealing with particular species (for instance, wild migratory animals), ecosystems (for instance, wetlands), resources (for instance, Antarctic marine living resources), or manmade threats (for instance, climate change), these instruments are also of direct national concern.

Over the years, India has strengthened its participation in international negotiations. However, consistent efforts are needed to keep pace with emerging issues. India also needs to build coalitions and cooperate with its neighbours, with other countries in Asia, and with the rest of the world, to bring about national, regional, and global change.

5.42 Mainstreaming conservation in sectoral policy

The threats posed by environmentally insensitive development have to be tackled at the level of sectoral policies. This calls for practical and effective approaches to balance social, economic, and environmental priorities. Tools and methods for valuation of ecosystems, of the goods and services they provide, and of social and environmental impacts can help to integrate conservation into decision-making. These are areas of growing importance where India should work together with other countries to mutual advantage.

5.43 Sustaining fragile transboundary ecosystems

India shares mountains, deserts, forests, rivers and oceans with its neighbours in south Asia, *viz.*, Bangladesh, Bhutan, China, the Maldives, Myanmar, Nepal, Pakistan, and Sri Lanka. Many transboundary ecosystems are in a fragile state, requiring sub-regional cooperation for

sustainable management. This needs to be supplemented by national, sub-national, and local efforts to improve policy and practice. Common pool resources, and protected areas that may lie within such ecosystem boundaries would require special treatment

5.44 Integrating empirical research into policy and practice

Rigorous ecological studies are necessary to understand the magnitude, patterns, and rate of biodiversity loss. Research that draws upon indigenous knowledge and uses multi-disciplinary and interdisciplinary approaches helps to understand the ecological impact of human activity. Such empirical research is as important in protected areas, in common pool resources, and in fragile ecosystems outside these two categories. The resultant knowledge must find a place in practice by resource managers, and in national and sub-national policy.

5.55 Strengthening IUCN membership

Together with the IUCN country office, the National Committee will be responsible for planning, implementing, and reviewing the country programme. Clearly, the quality and impact of the programme will be determined by the collective strength of members. Once established, the country office will interact closely with members, to appreciate their respective interests, and to understand their capabilities. In keeping with the demands of the country programme, it will also be necessary to actively seek out new members and partners to join the IUCN community in India.

With the country programme in place, the National Committee is expected to become far more active. This will call for systems, procedures, and norms for equitable participation, constructive dialogue, and collaborative action.

In addition to programme support, the country office will provide members with easy access to IUCN databases and publications. Documentation of success, failure, and lessons learned will be a key task. It will also facilitate interaction of Indian members with regional members, global members, and IUCN commissions.

Annex 1

Participants at the IUCN consultative workshop
May 1, 2006
New Delhi

Representatives of IUCN member organisations

1.	Mr. V.K. Uniyal	Attapaddy Hills Area Development Society
2.	Mr. Manoj Dabas	Ashoka Trust for Research in Ecology and Environment
3.	Mr. Yogesh Gore	"
4.	Dr. Asad Rahmani	Bombay Natural History Society
5.	Mr. Kartikeya Sarabhai	Centre for Environment Education
6.	Dr. Ashok Khosla	Development Alternatives
7.	Mr. Prafull Deshpande	"
8.	Mr. Uppeandra Dhar	GB Pant Institute of Himalayan Environment and Development
9.	Dr. A.B. Wagh	Gujarat Ecology Society
10.	Mr. C.N. Pandey	Gujarat Ecological Education and Research Foundation
11.	Mr. Justus Joshua	Gujarat Institute of Desert Ecology
12.	Mr. Yash Sethiya	Foundation for Ecological Security
13.	Mr. Samar Singh	"
14.	Prof. D.K. Bandopadhyay	Indian Institute of Forest Management
15.	Mr. Joy Daniel	Institute for Integrated Rural Development
16.	Prof. Gunavant M. Oza	International Society of Naturalists
17.	Mrs. Gunavant M. Oza	"
18.	Dr. M.K. Ranjitsinh	Indian National Trust for Art and Cultural Heritage
19.	Dr. R. B. Lal	Ministry of Environment and Forests
20.	Dr. Prodipto Ghosh	"
21.	Mr. RPS Katwal	National Board of Wildlife
22.	Mr. Biswajit Roychowdhury	Nature Environment and Wildlife Society
23.	Ms. Ajanta Dey	"
24.	Ms. Lalitha Vijayan	Salim Ali Centre for Ornithology and Natural History
25.	Mr. P.R. Sinha	Wildlife Institute of India
26.	Ms. Belinda Wright	Wildlife Protection Society of India
27.	Dr. Kinsuk Mitra	Winrock International India
28.	Mr. Pankaj Lal	"
29.	Ms. Sharmistha Bose	"
30.	Mr. Ravi Singh	World Wide Fund for Nature- India
31.	Mr. Sachin K Badkas	"

IUCN representatives

32.	Ms. Aban Marker Kabraji	Regional Director, Asia
33.	Mr. Gabor Bruszt	Consultant
34.	Mr. Mark Halle	Director, IISD Geneva
35.	Mr. John Dore	Coordinator, Water and Wetlands Programme, Asia
36.	Dr. Zakir Hussain	Director Constituency, Asia
37.	Mr. Kent Jingfors	Regional Programme Coordinator, Asia
38.	Dr. T.P. Singh	Programme Coordinator, Ecosystems and Livelihoods, Asia
39.	Ms. Daman Singh	Consultant

Annex 2

Ecosystems in India

Forests

Forests cover 76.5 mha (23.3% of the geographical area), largely spread over the mountainous, hilly, and plateau regions. Tropical dry deciduous forest is dominant (38.2%) followed by tropical moist deciduous forest (30.3 %), tropical thorn forest (6.7%), tropical wet evergreen (5.8%) and subtropical pine forest (5%). The extent of temperate forest and sub-alpine and alpine forests is 5.6% and 4.3% respectively. Dense cover exists in about 38 mha (%), while 25 mha (%) is open forest. While the forest area has stabilised in recent years, its quality remains a matter of concern in several regions

Roughly 90% of forests are managed by the state, making them the most regulated of all ecosystems. The eastern Himalayas are known for the continued existence of a variety of common property regimes and management systems. This region is known for its tremendous biodiversity, and high endemism of species, even as vast areas are yet to be explored. As many as 64 fauna species, and several species of orchid, rhododendron, and bamboo are threatened. Shifting cultivation, extraction of forest produce and hunting are the chief local uses. Forests are also subject to dams and reservoirs, timber harvesting, and illegal trade in plants and animals. The western Himalayas have a longer history of external intervention since colonial times, and are hence relatively better known. As many as 81 mammals, 47 birds, 15 reptiles, 3 amphibians, and about 1500 species of plants are endangered. Illegal trade in animals (Musk deer, Himalayan black bear) furs, wool, butterflies and plants is a serious problem. Settled cultivation, livestock rearing, and horticulture are the main occupations of the people.

The Western Ghats have about a third of their area under forests. This region is also known for its exceptionally rich biodiversity, in parts quite undisturbed, and high endemism. The hills are the source of many perennial rivers. Steep topography and high rainfall leads to high soil erosion. The landscape is broken by human habitation, and by the practice of shifting cultivation. At some places, livestock is known to have transmitted disease to wild ungulates. Large dams have submerged stretches of forests and interrupted migratory pathways of fish. Forests in the peninsular region are interrupted by agro-ecosystems, and urban settlements. Agriculture, fishing, dams, sewage, pesticide, and sewage disposal constitute some of the pressures in the area.

Grasslands

About 12 mha (3.9%) are classified as grassland. These include the semi-arid pastures of western India, the humid semi-waterlogged grasslands of the terai belt, the rolling shola grassland of Western Ghat hill tops, and the high altitude alpine pastures of the Himalayas. In terms of grass flora alone, this ecosystems harbour 1256 species, 370 of which are endemic. While the alpine pastures are in climactic climax, the other types of grassland are maintained at various stages of succession by grazing and burning.

Livestock owned by pastoral and settled communities compete with wildlife for grazing. High grazing pressure, reclamation for agriculture and tree plantation, introduction and spread of exotic species, and fire pose risks to these poorly studied ecosystems.

Deserts

At just 2% of the geographical area, this category includes both hot and cold deserts. The sandy Thar desert and the salt desert of Kutch are both located in the western region. The high altitude cold desert is situated in the northern trans-Himalayan region. While some study has been made of vertebrates, relatively little is known about invertebrates and lower taxa.

Thar is the most thickly populated desert in the world (a density of 83 persons/ sq. km) and is home to both agricultural and pastoral communities. Low and erratic rainfall, and limited access to groundwater places heavy make rainfed cultivation an uncertain proposition. Hence, the dependence on livestock rearing is high. The introduction of canal irrigation has completely changed the landuse and habitat in the northwestern extremity. Urbanisation, mining and industrialisation have made major inroads in this desert.

In contrast, the low-lying Rann of Kutch region is sparsely populated. However, large expanses of this desert have been taken over for salt production. *Prosopis juliflora* is an aggressive invader of this habitat. Habitation in the harsh cold desert is extremely limited. The region is globally unique for having preserved almost intact the whole assemblage of wild ungulates and predators. Road construction in this area leads to landslides and soil erosion.

Wetlands

Excluding the river systems, the extent of inland and coastal wetlands is 4.1 mha, of which 2.6 mha are manmade. Freshwater wetlands include ponds, tanks, lakes, and reservoirs as well as running water resources like rivers, streams, canals, and drainage channels. These resources support a variety of species, many of which are threatened, including 7 mammals, 17 birds, 11 reptiles, one amphibian, 18 fish, and one invertebrate species. There is little information about threatened invertebrates, and fauna species. Dams and weirs, industrial and sewage effluent, pollutants from agriculture, and siltation adversely affect this ecosystem. Invasion of exotics (such as water hyacinth, *Salvinia molesta, Alternanthera philoxeroides, and Ipomea carnea*) is common.

Brackish water wetlands such as lakes, lagoons, impoundments, and backwaters are essentially found in the coastal area, but there are a few habitats in the western arid region and in trans-Himalaya. A host of pressures operate on these wetlands, including extension of agriculture, pollution due to pesticide, aquaculture, poaching, bund construction, urbanisation, industrial estates, harbours and docks, tourism. Exotics (like water hyacinth, and *Panicum flavescens*) are known to invade brackish water wetlands.

Mangroves

This highly sensitive ecosystem extends to about 6700 sq. km in the coastal region. Many unique forms are found in alluvial deltas. The largest stretches are found in the Sunderbans, followed by the Gulfs of Kutch and Khambat, the Andaman and Nicobar islands and scattered patches on the east and west coast. Mangroves support about 105 species of fish, 229 crustaceans, and 20 kinds of shellfish. As many as 97% of plant species are threatened.

Local use includes removal of fuelwood, timber, tanbarks, medicinal plants, fodder, hides, honey, and wax. Commercial fishing is common and extraction of mollusk shell is known is some parts. The use of small mesh fishing nets is a destructive fishing practice. Recent reclamation for agriculture, aquaculture, urbanisation, siltation, and sewage and industrial effluent, exert pressures on mangroves. Dams and embankments alter the pattern of freshwater flow and affect salinity levels.

Coral reefs

Coral reefs are considered the most productive of marine ecosystems, but are extremely fragile and sensitive to environmental stress. They occur in the Andaman and Nicobar islands, Lakshadweep, and gulfs of Kutch and Mannar. Although poorly documented, about 200 species are reported from coral reefs, 179 from Andaman and Nicobar islands alone.

The reefs are susceptible to destructive fishing practices such as long lasting fish traps, small mesh size, over fishing, blast fishing, and trap fishing. Sedimentation is a well-studied impact, but its quantitative damage has not been assessed. Dredging projects, sand mining, coral quarrying for the cement industry, fly ash dumping, oil pollution, industrial waste, and sewage disposal are all sources of stress. Natural stress arises from tropical storms, cyclones, volcanic activity (in the Andaman and Nicobar islands), freshwater runoff (sediment, dilution), and disease.

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Annexure 3

Expected results of the IUCN India country programme (in consonance with the IUCN Asia regional programme framework

S.no	India country programme objectives	Expected results		
		Knowledge	**Capacity and empowerment**	**Governance**
1	Enhancing India's role in international environmental agreements	Improved understanding of how regional and international arrangements can support more efficient, effective, and equitable biodiversity conservation (2.1)	Enhanced participation of all relevant actors in the development, implementation, review and adaptation of regional and international arrangements that impact on biodiversity (2.3)	Improved relevance and effectiveness of regional and international environmental arrangements (2.4)
2	Mainstreaming conservation in sectoral policy	Reliable tools and methods available to organisations and people to assess tradeoffs between economic, social, and environmental values (1.6) Improved approaches to integrate environmental and economic values in decision-making, including methods for mobilising new and additional finance for biodiversity conservation (1.7)	Stakeholders make informed choices and negotiate outcomes that balance biodiversity conservation and human development needs (3.3)	National and sub-national policies, laws and institutional arrangements better integrate human wellbeing with biodiversity conservation (3.4)
3	Sustaining fragile transboundary ecosystems	Improved understanding of how social, economic, and environmental objectives can be reconciled in the management and restoration of ecosystems (3.1) Reliable tools and methods for integrated management and restoration of ecosystems (3.2)	Stakeholders make informed choices and negotiate outcomes that balance biodiversity conservation and human development needs (3.3)	National and sub-national policies, laws and institutional arrangements better integrate human wellbeing with biodiversity conservation (3.4)
4	Integrating empirical research into policy and practice	Improved understanding of species, ecosystems, ecological processes and ecosystems functions (1.1) Improved understanding of the interdependent nature of social equity and ecosystem functions (1.3)	Stakeholders make informed choices and negotiate outcomes that balance biodiversity conservation and human development needs (3.3)	National and sub-national policies, laws, and institutional arrangements better integrate human wellbeing with biodiversity conservation (3.4)

5	Strengthening IUCN membership	IUCN programme is developed in response to contemporary needs for conservation action, and lessons learned (4.1)
		Internal policies and procedures reflect standards of good practices, accountability and incentives, and support the delivery of the IUCN policy and programme (4.2)
		The capacity and means of the secretariat and commissions adapted and enhanced to effectively manage and deliver the IUCN policy and programme (4.3)
		Management structures and processes adapted to the needs of coordinated policy and programme that is implemented at all levels, from local to global (4.4)
		IUCN's messages developed from the programme are successfully relayed and received by a receptive membership that works towards the IUCN mission (4.5)

NB. The figures in brackets refer to the numbered results in the IUCN Asia Intersessional Programme (2005-2008), dated October 2003