THE INTEGRATION OF ECONOMIC MEASURES INTO THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN OF PAKISTAN

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List of Acronyms

AIM	Action Impact Matrix
BAP	Biodiversity Action Plan
BVP	Bar Valley Project
BWG	Biodiversity Working Group
CBD	Convention on Biological Diversity
CCHP	Chitral Conservation Hunting Program
CNG	Compressed Natural Gas
CTHP	Community-Based Trophy Hunting Programs
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESAF	Extended Structural Adjustment Facility
GDP	Gross Domestic Product
GEF	Global Environmental Facility
IEE	Initial Environmental Examination
IMF	International Monetary Fund
IPM	Integrated Pest Management
IUCN-P	The World Conservation Union-Pakistan
MACP	Mountain Areas Conservancy Project
MBI	Market Based Instruments
MELG&RD	Ministry of Environment, Local Government and Rural Development
NCCW	National Council for Conservation of Wildlife
NEQS	National Environmental Quality Standards
NWFP	North West Frontier Province
O&M	Operation and Maintenance
PAMP	Protected Areas Management Project
PEPC	Pakistan Environmental Protection Council
PMT	Project Management Team
SAL	Structural Adjustment Loan
SEA	Strategic Environmental Assessment
STEP	Society for Torghar Environmental Protection
TCP	Torghar Conservation Project
WWF-P	World Wide Fund for Nature-Pakistan

1. Background to Study

Pakistan is among a group of countries that are signatories to the Convention on Biological Diversity (CBD) It was signed in 1992, and ratified in 1994. The emerging discipline of Economics and Biodiversity is still in its infancy, even in the West. In order to provide a practical framework, IUCN – The World Conservation Union launched a new Environmental Economics Programme this year.

The GEF-UNDP-UNEP implemented Biodiversity Planning Support Programme (BPSP) has a mandate to provide assistance to national biodiversity planners as they develop and implement their National Biodiversity Strategies and Action Plans (NBSAPs). Under the BPSP, a series of studies are being carried out on key aspects of biodiversity planning related to national implementation of the Convention on Biological Diversity. One of these thematic studies aims to review experiences, lessons learned and ways forward in the use of economic measures in NBSAPs. This study is being co-coordinated by IUCN –The World Conservation Union.

The economics thematic study includes 4 components: an annotated bibliography of experiences, cases and lessons learned on the use of economics fro biodiversity planning; national/ regional; case studies on the integration of economics into NBSAPs; global workshop on the use of economics for biodiversity planning; and guidelines on using for biodiversity planning and NBSAPs implementation.

The national/ regional case studies on the integration of economics into NBSAPs are being carried out in South Asia, South East Asia, Eastern Africa, Southern Africa and South America, they aim to examine, in detail, how economic measures have been integrated into NBSAPs in countries in these regions.

The RBP (Regional Biodiversity programme) commissioned one case study to Pakistan entitled as ' **Integration of Economics into NBSAPs**. The Biodiversity Unit of the IUCN-P took this initiative and sub-contracted the study to SDPI (Sustainable Development Policy Institute) to prepare this national case study regarding the current status of biodiversity in Pakistan in the light of economic realities. However, Biodiversity unit provided support and technical advise to the researchers of the study at SDPI. The Global Environment Facility (GEF), the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP) are the donors for the Biodiversity Planning Support Programme. The mandate of this programme is to provide assistance to biodiversity planners as they develop and implement National Biodiversity Support Action Plans (NBSAPs).

In addition to the study one national workshop was organized by IUCN-P, to discuss the study. This workshop had different stakeholders who have been involved in the NBSAPs process and aim to discuss the case studies and suggest ways forward. The results/ outcome from the workshop will then be feeding into the global synthesis.

2. Pakistan Country Setting

Pakistan consists of a rectangular mass extending northeast to southwest over about 88 million hectares. Mountains and foothills on the north and west cover about half its area. The remaining half comprises the Indus Plain towards the east, intersected by the Indus River and its tributaries. The country is largely arid, with three-fourths receiving an annual precipitation of less than 250 mm and 20% of it less than 125 mm. Only about 10% of the area in the northern Himalayas and the Karakorum mountain ranges receive rainfall between 500 mm and 1500 mm. Of the country's total area of about 88 million ha, 24% is cultivated, of which about 80% is irrigated. Forests and grazing lands cover about 4%, and 34% is not fit for agricultural use - about 2% is under urban cover.

2.1. Biogeography and biodiversity richness of Pakistan[1]

With its dramatic geological history, broad latitudinal spread and immense altitudinal range, Pakistan supports a wide array of ecosystems. However, any description of the natural ecological zones of Pakistan must be qualified by the statement that these zones have been so widely affected by human activity that very few truly natural habitats remain. Roberts (1991) has provided an initial classification of terrestrial ecosystems into 18 distinct ecological zones (see Annex-1), with nine major vegetative or agro-ecological zones. These range from the permanent snowfields and cold deserts of the mountainous north to the mangrove forests of the Indus delta and the Arabian Sea coast. Its fauna is rich and varied: affinitive to three faunal regions - the Palearctic region west of the Indus, the Oriental region east of the region and the Ethiopian region.

Up to 167 mammal species have been reported, of which three are endemic and there are a number of endemic and near-endemic sub-species. Of the 662 species of birds recorded, one-third has Indo-Malayan affinities, and the remaining Palearctic. There are 172 listed species of reptiles and amphibians, of which 40 species are endemic. Pakistan has 177 native freshwater fish, predominantly South Asian in origin. In the invertebrate category, there are about 360 butterfly species, with high rates of endemism and about 2,000 species of insects.

Over 5,600 species of vascular plants have been described, including both native and introduced species. There is high species diversity and the flora includes elements of six phytogeographic regions. Four monotypic genera and 400 species are endemic to Pakistan. In the category of fungi, there are 847 genera and 3,383 species.

2.2. Economy

Although the country is making efforts towards industrialization, agriculture continues to be its economic backbone, contributing 25 percent to the country's national income, up to 70% of its exports and employing over half the country's work force. Much of Pakistan's industry is agro-based (textiles, sugar, edible oils), and the bulk of its exports are derived from agriculture. Major exports include cotton products (cloth, yarn and raw cotton), readymade garments, leather, synthetic textiles, carpets and rugs. Imports comprise machinery, petroleum and its products, chemicals, edible oils, transport equipment, grains and pulses, iron and steel and their manufactures, chemical fertilizers and drugs.

Pakistan maintained an annual GDP growth rate of 5.0% over the period 1972-2000. Over a shorter period, 1991-2000, this growth rate fell to 3.0%. Per capita income stands currently at $470, placing Pakistan in the category of low to middle income countries. Its social and human indicators are unenviable, below those of most developing countries. Poverty, overpopulation and illiteracy combine to create widespread malnutrition and disease, unemployment and low productivity.

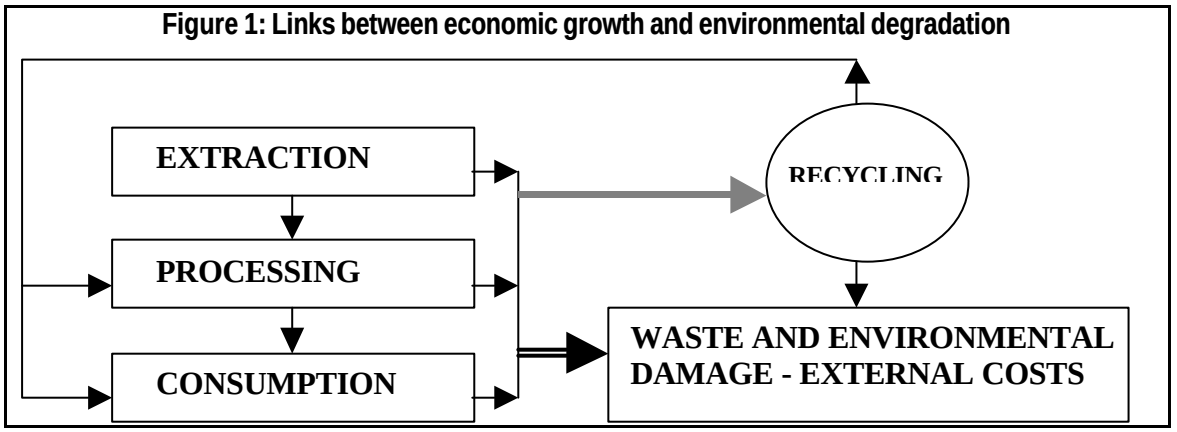
[1] For more details see, Khan (Khan & Naqvi: 1999)

Pakistan's human development index stood at 0.51 in 1997 (UNHDR, 1999). By recent count, a third of the population lives below the poverty line. Access to land, water and shelter is highly skewed. Not only is there marked disparity between the rich and the poor in urban areas but also rural access to schools, hospitals, piped water and roads compares unfavorably with its urban counterparts. In turn, this is a source of health hazards, declining productivity and environmental degradation.

2.3. The unsustainability of growth

The economic growth process has not been environment-friendly. The sources of degradation are both direct and indirect. The direct impacts reflect a failure to mainstream environmental activities within the development process (Jalal: 1993:9).[2] At some risk of generalization, one can define this process as highly resource, capital and technology intensive. Modernization, in and of itself, contains impulses for degradation; for instance, when economic opportunity and mobility depreciates the value of the resource base for communities drawing their sustenance from it, or when national legal and regulatory systems over-ride traditional, community-based resource management – in fact, are misused to exploit such resources unsustainably. Figure 1 illustrates the growth-degradation linkages

Figure 1: Links between economic growth and environmental degradation



An aspect of such growth is that little use is made of economic and financial incentives as a means to conserving land, forest, air and water resources, or using them in a sustainable manner. Inefficiency is generated by pricing distortions, which translates into resource use profligacy and pollution. Market failure and/or the absence of markets for environmental 'goods' and 'bads' are another source of degradation. Last, but not least, there is a direct link between the fiscal and financial outlays and policy, program and institutional effectiveness in addressing environmental concerns and mitigating adverse environmental impacts.

Indirect effects tend to be poverty driven. Inequitable growth and social sector neglect, which impoverishes and disempowers the poor, also makes them predators of the environment, creating a vicious cycle of degradation referred to as the poverty-environment nexus (Khan & Naqvi: 2000). The problem is compounded by a persistently high population growth rate, itself a consequence of misplaced development and budgetary priorities. In particular, terms such as 'ecological marginalization', and 'resource capture' point to some of the more destructive environmental outcomes associated with socially imbalanced growth.

[2] Specifically, this refers, not to the management of the environment per se but to the management of development activities within the assimilative capacity of the environment.

2.3.1. Environmental impacts

The more pervasive aspects of degradation are rising levels of emissions, water pollution, land degradation and deforestation. Brandon and Hammond (1995) have estimated that such degradation results in the loss of about 4% of GDP every year, thus offsetting the conventionally measured GDP gains. They estimate that the health impacts of water pollution are $759 million and that of air pollution $301 million per year. Added to this are water related agricultural production losses at $300 million per year.

The secular decline in Pakistan's environmental health is evident from several key indicators: roughly 38% of Pakistan's irrigated land is waterlogged and 14% saline; forests are being deforested at the rate of between 2.5%-3% per year, the annual increase in CO_2 emissions varies between 8%-10%; and an estimated 250 million gallons of untreated water is dumped into the Arabian Sea every day, causing great harm to both humans and the ecology. Water toxicity, triggered by the rural-urban interface, has begun to reach alarming proportions. While not fully documented, its debilitating health effects have begun to manifest themselves with increasing frequency, especially in the proximity of large cities and towns.

2.3.2. The consequences for biodiversity

The Biodiversity Action Plan (BAP) documents natural habitat and floral and faunal biodiversity losses in considerable detail:

The ecological trend of greatest concern in Pakistan today is the continuing loss, fragmentation and degradation of natural habitats. This is affecting without exception forests, rangelands, freshwater and marine ecosystems. Of equal concern is the continuing decline in many native species of animals and plants. Some species are already extinct, many are internationally threatened, and more still are of national concern Least documented is the loss of countless micro-organisms, the building blocks of genetic diversity (BAP: 13: 2000)

Clearly, the pathways from environmental degradation to biodiversity loss (plant and animal species and micro-organisms) can be both direct and indirect. Habitat loss, deterioration and fragmentation constitute an indirect route. At source are sectoral activities, such as industrial and household emissions and effluents, agricultural intensification (chemical input applications), irrigation and drainage practices (water diversions and mismanagement) and energy combustion.

Activities, which cause biodiversity loss directly, are hunting and trapping, fishing, over-exploitation of plants (for medicinal purposes), the introduction of invasive species through trade or natural resource management efforts. Sector activities (agricultural and industrial) can also contribute directly to biodiversity loss. For instance, extensive planting of high-yielding hybrid varieties has displaced indigenous crop genes, and the use of chemical inputs has harmed soil microorganisms, invertebrate fauna and wildlife.

By extension, efforts to address biodiversity loss are both sector driven and embrace the entire range of interventions, from acts, policies and regulations to physical measures. Physical interventions are remedial, aimed at restoring habitats and species, while policies tend to be pre-emptive, focusing on the causes rather than the symptoms of degradation and biodiversity loss. Quite clearly, it makes sense to adopt a holistic approach to biodiversity conservation. Admittedly, there are limits to what can be attempted or accomplished, given the funding and information constraints. But, an integrated approach towards biodiversity conservation, which sees the entire picture in terms of causes and effects, polices and direct measures, and sector linkages, is likely to generate synergies and achieve more sustainable long-term outcomes.

3. Macroeconomic and Sector Policies and Biodiversity Linkages

This paper focuses on the integration of economics into national biodiversity strategies. There are two related aspects to such integration. First, biodiversity needs to be valued explicitly to alert decision makers to the importance of sustainable resource use and to ensure that protection and conservation efforts are undertaken. Second, economic policies and measures are a key component of such efforts. Not only are they a logical consequence of valuation exercises but also their market linkages assure conservation gains in a relatively efficient manner.

An important corollary is that such policies and measures need not be restricted only to the biodiversity specific sectors, such as forestry, agriculture and rangelands. In some cases, such as in degraded water habitats (freshwater, marine), remedial measures can be sourced in sectors such as industry, households and energy, where the biodiversity linkages are indirect but equally important.

3.1. An analytical framework

An analytical framework for biodiversity loss assessment and remediation is presented below. It represents an attempt to integrate economics around national biodiversity strategies; with such integration being defined around three aspects, namely, valuation, policies and incentives.

3.1.1. Valuation

As the links between development and the environment are beginning to be understood better, the analytical tools and methods to assess such impacts within the conventional economic decision making framework are being developed also. Environmental impact analysis parallels conventional economic decision making at various levels, namely:

- International: global environmental economic analysis, e.g., climate change, ozone layer depletion, marine fisheries);
- National/macroeconomic: environmental economic analysis and environmental green accounting, e.g., forest, land, marine resources
- Regional/sector: integrated resource management and assessment; e.g. downstream environmental consequences of large dam construction, deforestation
- Sub-sectoral/project: initial environmental evaluation, environmental impact evaluation, e.g., mining in protected areas, industrial, transport projects, trade
- Sustainability assessments of trade policies

Box 1: Valuation

Why Natural Resources are Not Valued

The environment is seen as providing the following fundamental services or functions: a) supply of raw materials; b) absorption of waste products and; c) supply of amenity services. All three are a part of a more general 'life support function.'

Conventional economic theory assigns values (through the interplay of market forces) only to goods and services, which are 'rivalrous' and 'exclusive.' While raw materials have prices associated with them, the remaining three environmental components do not. This is because absorption, amenity and, in general, life support services are non-rivalrous and non-exclusive. By the same token environmental 'bads' (degradation, pollution) engendered by the production of economic goods and services -- and which threaten life support functions -- are also non-rivalrous and non-exclusive. 'Market failure' is the term commonly used to refer to the markets inability to recognize environmental goods (positive externalities) or bads (negative externalities). The absence of defined property rights is another factor

contributing to market failure (Coase's theorem). Basically, this means that economic theory founders in not having an 'existence theorem.'

The Need for Valuation

Valuation raises public and political awareness and ensures a better balance between 'development' needs and conservation. The primary aim is to provide a convenient and pragmatic reference source to guide decision-makers in the process of thinking about values in the context of biodiversity conservation and the sustainable use of natural resources. Specifically, biodiversity valuation:

reinforces biodiversity awareness creation efforts
allows judicious land-use decisions to be made
helps in prioritizing biodiversity conservation initiatives
helps in assessing biodiversity impacts of non-biodiversity investments
determines damages for loss of biodiversity regimes
limits biodiversity invasions
limits trade in endangered species
establishes the basis for revising national accounts
helps in the selection of economic instruments for conserving biodiversity

The generic purpose of valuation is to internalize environmental effects. Quantifying such effects brings them within the economic decision-making metric and ensures optimal choices.

What Should Be Valued

Biological diversity rather than biological resources is a more appropriate candidate for valuation. It embraces the variability of resources (species, richness, evenness, distance) and is an indicator of ecosystem resilience, namely its ability to withstand shocks, whether natural or anthropocentric.

Difficulties in measuring biodiversity suggest two approaches:

Restrict the count to certain combinations of species (notion of surrogacy)
Focus on ecosystems rather than species, although there is a loss of precision

Components of Value

Environmental economists have defined a taxonomy of economic values as they relate to environmental resources, based on the concept of total economic value (TEV). The TEV, which falls under the rubric of willingness to pay (WTP), reflects two broad classes of value, namely; a) use values and; b) intrinsic or non-use values.

Use values are composed of direct and indirect use values. Direct use values refer to extractive (e.g. timber) or consumptive (e.g. fishing) activities and have a price tag attached to them. Non-consumptive (e.g. hiking) values tend to be environmentally benign but are difficult to value.

Indirect use values are non-extractive and are difficult to value. Examples of economic benefits generated are, coastal protection and fishery breeding habitat provided by mangroves; watershed protection and soil stabilization provided forests; silt trap and flood control services provided by forests and ground cover.

The identified categories of intrinsic or non-use values are; option and quasi-option values; bequest values and; existence values. These values can be intra (existence) or inter-generational (option or quasi-option, bequest).

Box 2: Valuation and decision-making approaches

In principal, the internalization of biodiversity values ensures optimum production decisions, where output reflects the intersection of the marginal net private benefit and marginal environmental cost. Perhaps, the most important application of this principal is in the case of land-use change where conversion of forest land to agricultural, residential or amenity (tourism) use can be restrained by assigning biodiversity values to it. In a discounted cost-benefit analysis, which emphasizes the sustainable development aspect, the discount rate is appropriately modified to reflect the importance of conserving biodiversity for the future.

Needless to add, valuation is a complex task and has many facets:

Losses can arise from loss of resilience (the ability of species, ecosystems to return to their original status), a process of change marked by discontinuities and irreversibilities. Thus, not only should the resources be valued (use and non-use values) but a premium must also be attached to resilience, since valuation, in and of itself, may not be adequate security for it.
One of the aims of valuation is to be able to prioritize biodiversity conservation initiatives. However, prioritization means more than just identifying 'hotspots.' The cost of remediation in such areas may be prohibitive. Thus, cost-effectiveness may be more appropriate intervention criteria, namely securing the largest amount of conservation for a given level of expenditure.
The cost-effectiveness criteria may be more appropriate when valuing intrinsic, primary or spiritual benefits, as they tend to have a 0,1 (all or nothing, protect-all-biodiversity) character to them. Cost-effectiveness exercises allow choices to be made.
Another approach involves multi-criteria analysis, and is akin to cost-effectiveness when weights are not monetized.
The 'moral' approach, which ignores monetary values, is best used when genuine uncertainty concerns arise, namely, that biodiversity loss is likely to threaten life-support functions.
The precautionary approach makes the balance of decisions in favor of conservation. A spin-off of is the 'safe minimum standards' approach which favors conserving biodiversity until its cost becomes too high.
Deliberative and inclusionary procedures involve testing of stakeholder preferences through use of consultative procedures (focus groups, citizens juries, consensus conferences, deliberative polls). The process is transformative but can be influenced by dominant personalities. To ensure non-tranformativity, stated preference techniques (willingness to pay) can be applied.
Priority setting across countries should be based on three criteria, namely, biodiversity ranking, degree of threat (socioeconomic as well as biophysical) and response capacity (higher social and economic development index). Thus, countries with a high diversity, a high threat and a high response capacity would constitute a priority
A large part of the world's biodiversity resides in developing countries. Developed countries should finance conservation efforts (using incremental cost criteria) as well as ensuring the equitable distribution of benefits (for instance, resisting biopiracy)

3.1.2. Economic policies

Second, the paper looks at the interface between macroeconomic and structural/sector adjustment policies and the environment -- the sectors can be both biodiversity–specific (forestry, agriculture, fisheries) and biodiversity-related (industry, trade, energy). Its ultimate purpose is to identify mechanisms through which the choice of policies and reforms could be rendered more environment-friendly. In other words, it seeks to bring economic policy making within the purview of the environmental strategy. In this sense, it can be viewed as a "cheaper" component of the strategy -- cheaper in comparison with the traditional agenda of enhanced public sector investment. To this end, we will examine whether current economic policies and, in particular, policy reforms support or undercut conservation objectives and efforts.

Another important factor here is the increasing interdependence of the global economy. More and more economic imperatives are being dictated to individual countries through global financial management and trading practices. Individual countries need to adopt these economic policies and principles and at the same time align environmental and biodiversity conservation concerns with them. This can be done once a value is placed on the environment (and biodiversity in particular). Thereafter all environment specific and related sectors would be in a position to incorporate the affects of their policies and initiatives on the environment.

3.1.3. Prices and incentives

An important economic reason behind the erosion of biodiversity is the underlying disparity between private versus social costs and benefits (BAP: 25: 2000). Such divergence can arise because of intervention and market failures, which can be both biodiversity-specific and biodiversity-related and have relevance at the sector as well as project level. Valuation of biodiversity aims to address such failures. (See Box 1, Box 2).

Intervention failures tend to reflect pricing distortions. Examples are subsidies on energy and irrigation water, pesticides and fertilizer, which, among other things, are a source of air and water pollution and land degradation. Counter measures include getting prices right (eliminating subsidies) or providing conservation-friendly incentives, for example, a targeted – as opposed to universal - subsidy on natural gas, designed to encourage fuel-use shifts away from oil-base and biomass, and to encourage the installation of CNG engines.

Another instance of intervention failure is high discount rates which favor present rather than future consumption. The degradation tends to be most pronounced when such rates coincide with low biological growth rates (BAP: 27: 2000), for instance, in the case of primary forests. This approach, which favors the use of market instruments for environmental improvement, tends to be championed by the multilateral financial institutions.

Pricing distortions need to be viewed and addressed in the entirety of the context within which they operate. For example, subsidies on fertilizer may contribute to their overuse- thereby negatively affecting soil and water quality which in turn could have negative consequences for biodiversity. However, removing subsidies alone may not be the answer to the problem, as specific institutional measures like improved awareness of use of fertilizers, introduction of IPM, and research and extension maybe required to bring about the desired change in behaviour and attitudes of farmers. Taking another example, inadequate pricing of water may or may not result in the farmer overusing the resource. In the context of Pakistan water for agricultural purposes is already scarce between provinces and within provinces between those near the head and those at the tail end. Then there is the issue of inadequate funds for O&M of watercourses. So, when one talks of correcting distortions in the price of water, one is essentially looking at the entire picture where proper pricing would not only reduce and misuse but would also generate resources for O&M.

Market failure occurs when the market is unable to monetize environmental degradation/biodiversity losses. Two prominent examples of these are the extensive logging activities by the 'timber mafia' in the Northern watersheds in disregard of the downstream consequences, and industrial effluents, which pollute water bodies and harm aquatic life and vegetation. In the former case, high market prices for timber and the prevailing royalty system combine to create perverse incentives to degrade. Monetizing such degradation can entail imposing a stumpage fee on each tree cut or linking royalties to tree stands rather than trees cut. In the latter case, explicit pollution charges could be imposed on factories, which pollute above minimum specified limits. This approach can best be described as 'invoking the market', and advocates the use of market-based instruments (MBIs) for sustainability. While this approach is also favored by financial institutions, it is rarely recommended, nor has there been adequate work on establishing conditions under which such incentives would produce the desired results.[3]

The term market failure also includes missing markets. This is the case with global warming, ozone layer depletion or species loss where global imperatives are not reflected in national policies. Conversely, as in the case of biopiracy ('neem', 'basmati' rice) multinationals present threats to indigenous biodiversity. These threats can be countered or mitigated against by having an incentive structure in place which acts to protect the indigenous knowledge and

[3] During the NEQs process the Ministry of Environment, PEPA, SDPI, FPCCI, OICCI and other NGOs and business organizations jointly undertook considerable work, leading to the landmark approval by the General Body of the FPCCI of the recommendation to levy a pollution charge on industry – perhaps the first of its kind anywhere in the developing world. Notwithstanding its significance and utility, the initiative may founder on the dismissive attitude that the finance and revenue organizations have adopted towards it. The multilateral finance organizations need to be more forthcoming in supporting this initiative.

practices of farmers as well as protect the diversity of crops and plants. Such an incentive structure might be based around promoting greater variety of crops and plants and getting them patented.

3.1.4. The institutional preconditions

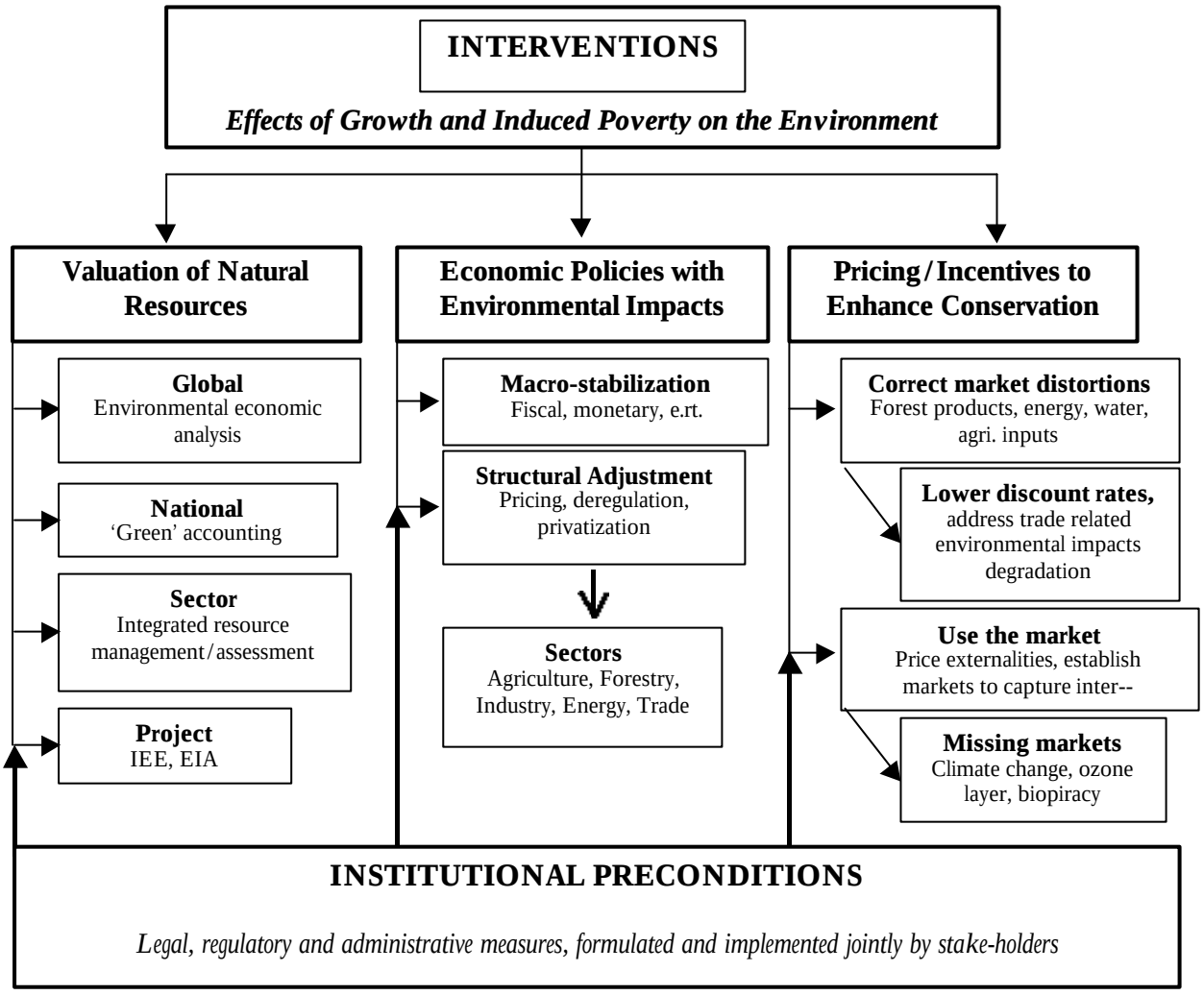
Environment specific policy initiatives require strong institutional support. Key to this are environmental protection laws, regulatory and implementation measures, which focus both on innovation and equity. For instance, EPAs with enforcement mandates tend to be technically and financially hamstrung. An intrinsically preferable option -- and one which accounts for such constraints as well, is voluntary compliance accompanied by random audits.

Similarly, legal and regulatory measures should define property rights and espouse participatory management principles, aimed at empowering communities. A precondition for instituting such rights and principles are consultative processes to ensure that they are enshrined adequately in the laws. Otherwise, legal and regulatory initiatives acquire a nominal character. Thus, various sector efforts (forestry, irrigation) at pricing environmental externalities face stiff resistance by politicians, large landowners and bureaucrats who benefit from the existing perverse incentives and subsidies.

Worse, even pro-poor measures can get subverted. This is strikingly evident in the sanction of property rights. While secure property rights are, in principle, a means of addressing sustainable development the reality in many cases involves expropriation of the poor. Thus not only are such rights questionable on the grounds of equity, they can lead to conflict, non-cooperation and theft and thus cause environmental harm. This is evident in the case of 'guzara' forests; where the rights to timber and fuel wood overlap with land ownership rights.

The analytical framework is presented below in a simple and stylized manner in Figure 2.

Figure 2: An integrated framework



4. Development of the Biodiversity Action Plan: Process Description

Pakistan signed the Convention on Biological Diversity (CBD) in 1994, which was later ratified by the Federal Cabinet in the same year. The Ministry of Environment, Local Government and Rural Development (MELG&RD) along with the World Bank, established an ad hoc Biodiversity Conservation Coordination Group (BCCG) for developing a proposal for instituting requirements of the Convention. One requirement was the development of a national biodiversity action plan. During 1996, the World Bank provided funding through the Global Environment Facility (GEF) for the concurrent development of a Biodiversity Action Plan (BAP) and a proposal for a protected areas initiative, which came to be known as the Protected Areas Management Project (PAMP). The ad hoc BCCG was dissolved soon after funding was procured.

A Project Management Team (PMT), comprising representatives from MELG&RD, IUCN-P and WWF-P, was constituted to guide the process of developing the BAP and PAMP proposal. The PMT met once a month during the initial months and then at significant stages of project development. IUCN-P was chosen as the lead implementation agency in collaboration with the World Wide Fund – Pakistan (WWF-P).

An advisory body, known as the Biodiversity Working Group (BWG), was formed soon after the launch of the BAP project. The BWG, comprising 22 national level experts from different related fields, was tasked with reviewing and approving the BAP and recommending actions based on obligations under the Convention on Biodiversity (CBD) for incorporation into the BAP. The Group was also tasked with offering technical advice on various biodiversity initiatives, including the PAMP. These experts included environmentalists, foresters, specialists in wildlife, livestock, agriculture, natural; history, taxonomy, fisheries, tourism, marine sciences, zoology, biotechnology, protected areas management, development practitioners from across sectors and a sprinkling of economists. Economic input was relatively thin, a surprising omission, considering how critical biodiversity-economics linkages are.

4.1. Preparation of the BAP

The outline for the BAP was prepared during a two-day consultative workshop held in September 1996. Representatives from a cross section of private, non-profit and government organizations were invited to participate in the workshop. The purpose of the workshop was to: develop a framework for the BAP and agree upon its contents; identify and prioritize issues and concerns within specific areas of interest; current and planned biodiversity conservation efforts in Pakistan; and sources of information and expertise within each area of interest.

Participants were sub-divided into groups for discussion on specific topics. The topics themselves were identified based on land-use practices and resource management. All key biodiversity areas such as agriculture, animal husbandry, coastal zones and marine fisheries, forests and economically important plants, invertebrates, microbiology, genetics and biosafety, wetlands, fresh water and inland fisheries, and wildlife and protected areas came under discussion. The outcome of group discussions was later shared in a plenary. The observations and recommendations of the group sessions were supplemented by oral and written observations. The workshop also provided an opportunity to gather information on individuals and organizations working in the field of biodiversity and conservation for a national database.

Following upon the results of the workshop, the review of BAP related activities in Pakistan and in other countries; thirteen national experts were contracted for writing sectoral background papers for the BAP. Information from these background papers and other sources was used to prepare the

first draft of the BAP. The draft was then circulated amongst more than 230 individuals for comments and reactions in October 1997. This was followed by workshops at the federal and provincial levels where priority actions and strategies for the future came under discussion. Based on concerns and issues raised at the workshops, a six-member committee was formed by the BWG to review and incorporate suggested changes and fill lacunas in the draft BAP. The revised BAP was reviewed and finalized by the BWG in October 1998.

In August 1999, three years after the process was initiated, the Pakistan Environmental Protection Council (PEPC) endorsed the BAP[4].

4.2. Economic Analysis in the National Assessment

The level of economic analysis in the National Assessment leading to the preparation of the BAP was fairly sporadic. Economic incentives were discussed in the initial two-day consultative workshop. Subsequently, a background paper on economics was commissioned but, in spite of repeated attempts, the authors were unable to trace the paper in question. During the course of the National Assessment, incentives were discussed only once, following a request by the MOE to SDPI to make a presentation on the subject at a pre-project workshop on the GEF, Protected Areas Management Project.[5]

A reasonable conjecture is that this outcome was less due to oversight and more a consequence of lack of capacity and absence of institutional integration of disciplines. Most organizations working in the field of conservation are hamstrung by lack of capacity for integrating economic analysis into their work. Related to this is the lack of understanding with regard to the role of multi-disciplinary approaches and strategies. Many in the field still regard environmental problems as being confined to the disciplines of 'natural sciences' and legislative enforcement at most. There is little recognition of the need to draw upon other disciplines for formulating initiatives at the institutional level. The task of integrating economics into biodiversity conservation is made all the more difficult by the fact that establishing such linkages is in itself a complex task.

[4] PEPC is a high level body making policy related to protection and conservation of the environment. It is headed by the Prime Minister, and includes the Chief Ministers of the four provinces, Federal Environment Minister (Vice-Chair), federal secretaries, private sector and NGO representatives.

[5] The title of the presentation was, "The Role of Civil Society in Financial Sustainability."

5. Economic Measures in the Biodiversity Action Plan and the NCS

5.1. Overview

State agencies have, traditionally, relied on command and control, as opposed to market-based measures for affecting pollution and resource use. However, monitoring and regulatory institutions often lack the financial and technical resources to be effective, key factors in the failure of government policies. Moreover, many of the laws are imprecise or environmentally unsound; penalties too low; and coordination between different organs of the state limited or absent.

Theory -- if not the practice -- recognizes that economic instruments offer a more cost-effective and efficient approach to many pollution abatement issues. Through price-based incentive structures, environmental standards can be reached at a lower cost by imposing the burden of pollution control on those most able and willing to meet it. Those who do make reductions (alter their behavior) are rewarded through reduced tax payments or through ownership of valuable permits. Price based measures also create dynamic incentives to pollution control which do not stop once a target is met.

The use of various economic instruments allows additional environmental improvements to be met at least cost, and/or present standards to be met more cost-effectively. To implement these on a wide-scale, though, we need to understand more about how to operate such instruments in practice. Contextual (cultural, institutional, economic considerations) should determine what, when, where and how economic instruments can be used. This would require:

Assessing where use of economic policies and instruments is particularly suitable, and where traditional regulation may still be more appropriate;
Reviewing the range of policies, tools and instruments that offer economic incentives and;
Examining actual or potential applications of economic instruments in order to assess their feasibility and to identify barriers and/or facilitating conditions.

5.2. Description and review of economic measures in BAP

Within the analytical framework developed, actions recommended in the BAP address issues of valuation and linkages between biodiversity and macroeconomic and sector policies and incentives. However, the recommendations, especially on pricing and incentives, go into considerable detail, they are broad and non-specific, or go only 'half-way' towards establishing such linkages. Since specific sectors, institutions, and mechanisms are not identified, it becomes difficult to evaluate how useful a particular action may prove to be with regard to addressing institutional and market failures, or the extent to which it compliments or negates other activities aimed at environmental conservation.

5.2.1. Economic policies

With reference to developing links between macroeconomic and sectoral polices and biodiversity, the only BAP recommendation is to, "Integrate biodiversity considerations into the Perspective Plans, Five-Year Plans and Annual Development Plans (ADPs); and into relevant sectoral plans, particularly those for wildlife, forestry, fisheries and agriculture". This is too general and does not delineate specific biodiversity linkages with, for instance, trade, energy pricing, privatization or exchange rates policies and which can have a marked impact on natural resource use.

5.2.2. Valuation

With reference to placing a value on biodiversity, the BAP provides general guidelines for such valuation (Box 3). Clearly, these need to be taken to a greater level of detail both with regard to identifying methodologies and techniques and sector requirements.

Box 3: Valuation Guidelines in the BAP

12.1 Develop, document and adapt standardized methodologies for economic valuation of biodiversity, tailored to the requirements of individual decision-making organizations.

12.2 Initiate measures to 'green' the system of national accounts.

21.1 Finalize detailed rules, regulations and guidelines for the implementation of IEE/EIA under the 1997 Act, to include a checklist of processes and activities which have or are likely to have significant adverse impacts on biodiversity, for example, major power and road building projects.

21.4 Expand the concept of Strategic Environment Assessment (SEA) to address the environmental impacts of programmes and polices such as the National Drainage Programme or agriculture policies that promote the production of monoculture export crops.

21.5 Review the National Environmental Quality Standards (NEQS) with due consideration [to quantifying] the potential impacts on specific ecosystems, for example the effects of sewerage discharge and industrial effluents on aquatic ecosystems.

5.2.3. Pricing and incentives

Most of the recommendations in BAP fall within the category of incentives (Table 1). The document recommends introducing a system of direct and indirect incentives and disincentives to discourage unsustainable utilization and practices, which deplete biodiversity. As indicated, while considerably detailed, the recommended actions are largely non-specific with regard to actual mechanisms, sectors, practices, measures and institutional arrangements.

Table 1: Incentives in the BAP

Direct Incentives	Direct Incentives	Indirect Incentives	Disincentives	'Perverse' Incentives
14.1 Introduce a system of direct incentives that could include a) Provision of subsides to farmers for: retaining local cultivars and crop varieties adopting integrated pest management; agro-forestry; and multi-species cropping b) Encouraging landowners, through subsidies, to	*2.4 Update and rationalize legislation on endangered and exploited flora and fauna in Pakistan…Enhance penalties for violations and introduce a system of rewards for compliance.*	*14.2 Introduce a system of indirect incentives to promote the conservation and sustainable utilization of biodiversity that could include* a) Fiscal incentive measures tax exemptions/ deductions) for conservation of particular habitats/species; tax reductions in import of equipment	*14.3 Introduce a system of disincentives* a) Increase the size of fines for violation of conservation laws b) Revise tax schedule to penalize undesirable land-use practices c) Use fiscal disincentives, e.g., pollution and effluent charges, for activities damaging to biodiversity. This could include use of 'polluter pays' policy,	*15.1 Carry out a comprehensive review of GOP programmes and policies, to identify perverse incentives and suggest measures to ameliorate their impacts.*

manage their properties in ways, which are sensitive to biodiversity. c) Provision of grants for protection of threatened species or habitats, and restoration of degraded lands. d) Development of programmes which insure local communities receive direct benefits from biodiversity, e.g., through sustainable use activities e) Incentives to encourage ex-situ propagation/breedin g programmes for traded species of wild plants and animals f) Provision of incentives (regularization, training, etc) for field staff working in institutions dealing with biodiversity.		for conservation initiatives; tax deductions for donations to conservation NGOs. b) Service-oriented incentives: Linking provision of services with biodiversity conservation, e.g., priority in provision of social/technical services to communities living adjacent to protected areas. c) Social incentive measures designed to improve the quality of life, measures such as clarification of land tenure and the creation of new institutions to manage biodiversity.	requiring developers to take measures to mitigate the environmental damage caused by their activities. d) Promote and strengthen traditional customs and practices which serve as disincentives to unsustainable use.	

5.3. Description and review of economic measures in the National Conservation Strategy (NCS)

The NCS is a precursor and a guiding document for the BAP. It refers to the economic and social significance of biodiversity, identifies levels and trends in biodiversity loss, the factors contributing to it and summarizes the protective measures taken at both national and international levels. The approach of the NCS is both biodiversity specific (protected areas management) and encompasses institutional strengthening in a broader environmental context but with relevance to biodiversity as well. Elements of valuation and pricing are also to be discerned in the institutional recommendations, for instance:

- Internalizing the cost of environmental degradation;
- National Environmental Quality Standards (NEQS);
- Environmental Impact Assessments (EIA);
- Monitoring enforcement;
- Strengthening of environmental institutions;
- Mass awareness.

5.4. Adequacy of economic measures in BAP

Biodiversity-economic linkages are best articulated in the context of environmental conservation. Even though this has complex institutional implications, failure to deal with the problem holistically

can lead to unsatisfactory and conflicting outcomes. Simply put, economic policies, measures and incentives should address both the direct and indirect causes of biodiversity loss. In other words, dealing with pollution at source can yield as many biodiversity dividends, as efforts to protect species and habitats. A few examples should suffice to illustrate this

Marine and Freshwater Fisheries: Species and habitat loss is occurring at an alarming rate. A sole focus on biodiversity conservation, using economic measures, entails penalties for over-harvesting, more stringent licensing, reconstituting fishing contracts etc. But this fails to address the more generic issues like, water pollution, salt-water intrusion, mangrove loss? Economic and pricing policies at the sector level (industry, agriculture, irrigation) which address these concerns are as -- if not more -- important than the direct economic incentives and measures aimed at limiting catches.

Game Birds and Animals: The concern here is with habitat rather than species preservation. 'Markhor' and 'ibex' are at the top of the biodiversity ladder, supported by a vast natural infrastructure. A protected area/ecosystem approach to conservation is self-evident. But even this does not constitute adequate protection against the depredations of the timber mafia, fuelwood extraction and foraging for fodder -- activities which compete with and threaten floral and faunal biodiversity. This necessarily means invoking sector pricing and economic policies -- namely, in the context of forestry, rangelands, energy.

The basic message is that economics-biodiversity linkages tend to broaden analytical perspectives. It is not enough that this study be of value to biodiversity and wildlife specialists but that environmental and biodiversity conservation be brought within the ambit of macroeconomic and sector policy. In fact, by and large sector activities tend to be biodiversity-related rather than biodiversity specific. Nowhere is this more evident than in the BAP itself. Chapter 2, the section "The Direct Causes of Biodiversity Loss," cites these causes as deforestation, grazing and fodder collection, soil erosion, water diversion and drainage, agricultural intensification, pollution and trade (invasive species) and global climate change. By contrast activities which impact biodiversity directly are indicated as hunting and trapping, fishing, and over-exploitation of plants.

Moving on to the section, "Indirect Causes of Biodiversity Loss, the economics sub-section cites these as market failure, intervention failure, weak ownership, and high discount rates. The sector spread here is also apparent. Economic interventions which address the sources/causes of biodiversity loss, cannot ignore this sector spread, and 'focus on biodiversity alone'. There is an environmental/cross-sector dimension to economic remediation which cannot be disregarded.

The BAP's success in identifying causes of biodiversity loss contrasts with its inability to develop an analytical framework for addressing them. The absence of vertical (macro, sector, project) linkages is apparent in a number of incentive measures proposed in the BAP. For instance, it refers to fiscal incentives such as, tax exemptions, tax reductions and tax deductions for biodiversity conservation. None of these are acceptable within the present framework of sector reforms, which aim to unify tax policies -- one of its objectives being to get rid of special exemptions. When the tax-to-GDP ratio is already low, it does not appear viable to recommend further reductions. It is more appropriate to focus on measures which fall within the ambit of the prevailing thrust of the economic reforms, such as eliminating price distortions and addressing market failure.

The BAP also refers to: a) subsidies to farmers for retaining local cultivars, adopting IPM, multi-species cropping and agro-forestry; b) of subsidies to landowners to manage their properties in ways sensitive to biodiversity and; c) provision of grants for protection of threatened species, habitats, restoration of degraded lands. It is evident that the emphasis is on handouts -- the size of such handouts to restore degraded lands could be enormous. Clearly subsidies, too, run counter to the prevailing economic reform philosophy.

On the other hand, the sector disincentives referred to in the BAP are far more consistent, namely revising tax schedules to penalize undesirable land-use practices, and fiscal disincentives such as pollution and effluent charges. By the same token, they are not biodiversity specific. While this is an encouraging beginning, basically, a lot more work needs to be done to come up with biodiversity-specific and related incentives which are consistent with macro and sector level economic reforms.

6. Economic Polices and Measures in Biodiversity Conservation: Implementation Status

The terms of reference require description of economic-biodiversity linkages following the official adoption of the BAP. Such an analysis is restrictive, as numerous parallel initiatives, which address valuation, economic policies, pricing and incentives, have been underway for some time but are not linked in any way with the BAP. Illustratively, these include the NCS, NEQS, ISO-14, 000 and various World Bank/IMF economic reform programs. It would be inappropriate to ignore these as they can strengthen and benefit from the BAP, the mutual synergies in such integration being self-evident. Agreed, the task has complex operational and financial implications, but biodiversity conservation requires an eclectic approach, given its backward and forward linkages and multi-sector nature. The challenge is to come up with efficient and viable solutions in the light of these constraints. In fact, the BAP has made initial headway in this direction, by establishing criteria for protected area management projects. The Mountain Areas Conservancy Project (MACP), IUCN, and the Protected Areas Management Project (PAMP), World Bank, are two important projects selected on the basis of these criteria.

The following sections review macroeconomic and sector reform programs, and biodiversity projects focusing on their economic-biodiversity linkages. Valuation and institutional aspects, integral to establishing these linkages are also reviewed.

6.1. Biodiversity valuation

6.1.1. Data needs

Good environmental data is necessary for assessing biodiversity losses or, conversely, its benefits. It is a precondition for valuation in the context of national environmental accounting; also, a monetary numeraire to such losses (benefits) makes formal cost-benefit analysis possible. Even where impacts are difficult to quantify, good physical indicators permit cost-effectiveness, multi-criteria and consultative exercises to be undertaken.

The standard framework for approaching environmental information is the "Pressure-State-Response (PSR)" model. It is a useful framework for classifying and developing indicators of environmental quality. It also provides a context for incorporating socio-economic and environmental linkages and synergies. A modified PSR framework developed by Rogers *et al* (1997) is presented in Table 2.

Table 2: Modified pressure-state-response framework for indicators

Pressure	**State**	**Impact**	**Response**
Human activities putting pressure on the environment	*State of Ambient Environment Quality*	*Impacts with ambient consequences*	*Response policies*
Industry Agriculture Transportation Energy Others	Ambient air quality Water quality Land Troposphere Other	Human Health Economic Productivity Extreme Events Biodiversity loss	Economic instruments Institutional efforts Pollution reduction Species protection Others
Examples			
GHG Emissions	Concentration	Climate Change	Carbon taxes, tradable permits, technology development
Waste generation:	BOD, COD, TSS, TDS,	Human health, biological	Pollution charge, regulatory

municipal, industrial, agricultural	heavy metals, Soil/groundwater quality	diversity, aquatic life	systems, institutional development, technology policy, fiscal incentives

6.1.2. Institutional capacity

Data on environmental variables is collected directly by the Federal Bureau of Statistics (FBS), as well as indirectly from the information collected and published by other governmental agencies. In recent years, the FBS has compiled the available data and published it in environmental compendiums. Other agencies collect such data partly because of their own planning, assessment and monitoring needs, and partly in response to requests from domestic or international sources.

At the outset, it should be noted that there has been a definite improvement in the availability of environmental data in Pakistan. The latest Compendium on Environmental Statistics is a vast improvement over its predecessors. It reports data on solid and liquid waste discharges, underground water contamination, fire wood consumption (page 113), energy consumption by fuel type (143-4), drainage facility by type, noise level, emission of CO, clouds and precipitation, sector wise air pollution. Even pre-NCS (1980) data is reported for housing and housing facilities (page 61-71),

However, data availability and quality varies considerably across the terrain. On some variables there is a long time series of data. These are the "traditional" environmental variables, in other words those that were included in development and planning calculations even before environmental concerns proper made their appearance. They include especially soil quality, soil erosion, water logging and salinity, water availability and off take, fertilizer and pesticide use, and forests. In some of these areas (especially forests, and pesticide use) the quality of the data is highly suspect. In other areas, there exist sample surveys, independent studies, or other non-recurrent sources of data. They include energy and fuel wood use, and more recently, data on air and water quality and solid waste generation and disposal. On other areas, there is currently no reliable information.

6.1.3. Attempts at valuation

Despite the data problems, limited efforts have been made to value environmental resources at the national level. The approach has been to develop an index of the human and economic costs of environmental degradation. This index can be viewed as the costs of inaction (and by implication the environment-related benefits of action) on environmental conservation. Carter Brandon (1995) who estimated the health and economic costs of environmental degradation constructed such an index for Pakistan. He estimated the annual costs of degradation to range between US$ 1,092 million and US$ 2,080 million (i.e. between 2.6 and 5 per cent of GDP). His study was hamstrung by a number of factors, including the unavailability of the relevant data, the limited variables of interest selected by him (and especially the virtual exclusion of resource degradation from the analysis), and the analytical problems in placing a money value on human life and health. Despite these problems, and despite the conservativeness of its approach, the study is valuable in two ways. First, it is the first study to provide a concrete number for the costs of inaction. Second, in the process, it illustrated the kind of information that would be necessary.

We will look at the availability of the above data in Pakistan. However, before we do so, it would be useful to examine other possible indexes of environmental degradation.

Rogers et al (1998) proposes an alternative approach. They estimate not the costs of inaction but rather the costs of remediation (COR), in other words, the annual cost of restoring the environment to some level of environmental quality. The COR is "a measure of the increase in defensive expenditures that a society must undertake in order to leave to future generations

environmental assets equivalent in quality to the ones the current generation received"[6]Again, while there are problems with the statistical basis as well as some conservative assumptions, they provide an extremely helpful aggregate figure for the country. They estimate that the annual cost of remediation of environmental degradation problems in Pakistan is $1,076 million (1990 prices). The bulk of this figure is allocated to the remediation of land degradation. As in the Brandon study, a by-product is the identification of data needed for a more definitive analysis. The information requirements for this exercise are a) baseline environmental conditions; b) assessment of degradation over a finite period and; c) the economic costs of available technological options for restoring or improving the environment.

Rogers *et al* (1997: 142-144) estimate the COR for Pakistan to be equivalent to 2.57 per cent of GDP (see Table 3), and suggest an order of priority for the country's environmental problems. Their estimates place urban congestion and pollution at the top, followed by land and soil degradation, deforestation, water quality deterioration, marine and coastal resource degradation, rising sea level, industrial pollution and waste disposal.

Table 3: Cost of remediation for Pakistan

	COR (million US$ in 1990 rates)
Water	53.97
Air	119.49
Land (erosion)	522.59
Solid Waste Management	187.21
Forests	157.40
Ecosystems	36.09
COR (total)	**1076.76**
COR per capita	9.58
COR as percent of GDP	2.57

Source: Peter Rogers et al 1997. Measuring Environmental Quality in Asia.

Environmental elasticity is a "derived" index, in the sense that it defines the secular relationship between changes in environmental quality (according to a particular index) and economic activity (GNP). It is defined as "the percentage change in an environmental aggregate as function of a 1 percent change in an economic aggregate"[7]. The EE's for Pakistan, calculated by Rogers *et al* (1997) can be seen in Table 4. The environmental quality index used in this elasticity is based on an aggregation of changes air and water quality and deforestation. The numbers need to be treated with caution --, as no more than a first approximation. Clearly, the elasticities are far too erratic, given the historically, slow rate of environmental change, and reflect data imperfections and inconsistencies.

Table 4: Environmental elasticities for Pakistan

(percent change in environmental quality index for a 1 per cent change in GDP)

Year	**Air quality**	**Forest quality**	**Water quality**	**Environmental quality**	**GDP per capita**	EE
1982-83	-15.18	-1.22	0.30	-5.36	0.58	-6.31
1983-84	-14.52	-1.49	-9.52	-8.51	5.44	-1.56
1984-85	-6.78	-1.78	10.28	0.57	3.16	0.18
1985-86	17.22	-2.11	2.22	-5.71	2.64	-2.16

[6] Peter P. Rogers and others. 1997. *Measuring Environmental Quality in Asia*. Harvard University Press. p. 62

[7] Peter P. Rogers and others. 1997. *Measuring Environmental Quality in Asia*. Harvard University Press. p. 76

1986-87	-9.03	-2.48	-13.62	-8.38	3.23	-2.60
1987-88	-14.25	-2.89	0.00	-5.72	1.66	-3.45
1988-89	-8.23	-3.36	2.16	-3.14	1.44	-2.18
1989-90	-18.00	-3.90	-0.18	-7.36	2.39	-3.07
1990-91	-9.81	-4.52	-2.49	-5.61	4.47	-1.25
1991-92	-10.12	-4.74	-4.26	-6.37	-0.17	9.05
1992-93	-12.16	-5.48	1.00	-5.55	0.94	-5.92

Source: Peter Rogers et al 1997. Measuring Environmental Quality in Asia.

6.2. The Economic reform process and its environmental/biodiversity implications

In the early 19s and through the 19s, Pakistan negotiated a series of extensive agreements with the World Bank and the International Monetary Fund. These agreements embraced both demand-side macro-stabilization and supply-side structural adjustment measures. A common feature of these programs is their almost exclusive economic orientation. While they expanded over time to include equity concerns, environmental sustainability aspects were never addressed substantively. This is not to say they were ignored, but the measures included were piecemeal and additive, as opposed to being an integral and protected part of the core socioeconomic agenda.

Table 5 shows the key elements of the reforms that have potential environmental impacts and are extracted from the following agreements (further details are provided in Annex-II):

1980-83: IMF, Extended Fund Facility, World Bank, Structural Adjustment Loan
1988-91: World Bank, Structural Adjustment Program
1993–96: IMF, Extended Fund Facility
1998-01: World Bank, Structural Adjustment Loan
1998-01: IMF, Enhanced Structural Adjustment Facility

Table 5: The economic reform agenda with implications for the environment

Macroeconomic Reform	**Fiscal Policy**		**Exchange Rate and Trade Policy**	
	Achieve fiscal balance. Substitute trade with direct and indirect taxes to improve the incentive structure. Reduce non-productive expenditure		Introduce flexible exchange rates, liberalize trade regime (eliminate quotas, special exemptions, reduce tariffs)	
Sector Reform	**Agriculture/Irrigation**	**Industry**	**Energy**	**Infrastructure (urban, transport)**
Price Measures	Deregulate prices, eliminate subsidies	Deregulate prices	Price at marginal cost and at the border equivalent	Eliminate subsidies, impose user charges
Privatization	Allow private sector entry in economic transactions, decentralize management, restructure or privatize public entities	Deregulate and privatize industrial units	Allow private sector entry, restructure and partially privatize public sector energy providers	Encourage private sector entry and restructure urban and transport services
Financial Allocations/Investment	Fund core investment		Finance and implement medium-term investment program	Formulate and implement investment program
Institutional Reform	Improve land titling and registration		Strengthen O&M, rehabilitate T&D system, institute	Increase role of local government and encourage private

			regulatory oversight for restructuring and privatization of public entities and private power	sector participation

Source: SDPI, 1999

The overall objective of the reforms appeared to be the creation of conditions in which markets would work more efficiently. This objective was to be achieved by limiting the size of the public sector through budgetary reform, introducing market-based pricing and incentives wherever possible (by eliminating subsidies, introducing market based instruments, and deregulating prices), switching from public to private ownership of assets and investment (privatization, deregulation, and establishment of private property rights in water and common resources) and initiating institutional reforms needed to make this transition possible.

This is not to say that the economic reforms have no environmental benefits associated with them. Thus, price rationalization is expected to lead to resource conservation and emission reductions across sectors by primarily influencing demand. Privatization, investment and institutional strengthening would engender similar supply responses. Macroeconomic reforms designed to achieve internal balance (taxation, expenditure) and external stability (exchange rate, trade) would create a favorable climate for growth by lowering inflationary expectations, enhancing efficiency and improving export competitiveness. In addition to the identified environmental benefits, reduced inflationary expectations would tend to relieve pressure on natural resources.

However, such expected environmental benefits are, essentially, spin offs from the core economic agenda rather than optimal outcomes that would ensue had environmental concerns been mainstreamed into this agenda. This is evident from the fact that:

there has been no effort to sequence the economic reforms keeping environmental impacts in mind.
low environmental priorities are reflected in the absence of explicit protection of environmental programs from budgetary cuts.
perhaps, the most critical disjuncture is between economic policies and complementary measures. Policies aimed at addressing market failure are very much in the incipient stage, while the institutional innovations that would make their application effective are also lacking.

The Action Impact Matrix in Section 7 represents an attempt at such mainstreaming.

6.2.1. Environmental elements in the reform programs

With increasing recognition of the need to address environmental degradation environmental initiatives began to be added to the reform agenda. For instance, in 1988, the Bank noted that the reform program "should be supplemented with an active population policy and natural resource/environmental management strategy." The 1993-'96, ESAF/EFF, Policy Framework Paper took the environment to a higher level of prominence. Table 6 shows the progression from no mention of the environment to generalized statements of intent, to specific environmental initiatives.

The environment specific reforms have focused mainly on investment, legal and regulatory aspects. Both are necessary adjuncts to economic incentives and policies. In the case of investment, implementation has fallen considerably short of intent. A faltering economy and budgetary stringency has reduced investment allocations substantially, both for environmental programs and for strengthening institutions and agencies (e.g., EPAs).

The situation with regard to legal and regulatory initiatives is more encouraging. Crosscutting reforms include revamping the environmental protection act, strengthening provincial and federal capacities in environmental assessment, monitoring and enforcement and enhancing environmental awareness.

The sector focus is on industry and irrigation. Industry sector legal and regulatory reforms are innovative, with reconstituted national environmental quality standards (NEQS) and an emphasis on voluntary monitoring and compliance. In the irrigation sector, extensive management reforms are on the anvil and are being given legal cover by the provincial governments. These reforms focus on decentralized irrigation and drainage management (provincial irrigation and drainage authorities, farmer organizations) and commercial water distribution (provincial area water boards). Forestry sector reforms fall outside the ambit of the IMF/World Bank reforms and have been spearheaded by a consortium of bilateral donors (SDC, the Dutch), bilaterals (Asian Development Bank) and international NGOs (IUCN). The sector initiatives are at risk because of inadequate stakeholder consultation – even while they claim to empower communities. Sustained commitment and effort will be required to make the legal and regulatory reforms work. Their community focus, loss of potential income and prerogatives for large, farmers, the timber mafia and irrigation department staff means that they will face stiff resistance from these groups.

One aspect of the legal reforms, which has been ignored and is critical to biodiversity and biodiversity-related pricing, is well-defined property and tenure rights.

Table 6: Environment-specific reforms

	World Bank, SAL 1988 – 1991	**IMF, ESAF/EFF, 1993 – 1996**	**IMF, ESAF 1998 – 2001**	**World Bank, SAL 1998-2001**
Agriculture	No explicit mention of the environment	Institute programmes and projects to tackle water logging and salinity		
Forestry		Undertake reforestation		
Energy				Develop a policy framework for the introduction of clean fuels and new technology
Industry			Increased enforcement of compliance by the industrial sector with sound pollution control strategies	Develop a comprehensive pollution control scheme for existing and proposed industry

Cross-Sectoral		Progress in improving standards and regulations for air, water and waste pollution	Preparation and enactment of the implementation rules and regulations for the 1997 Environmental Protection Act Promulgation of environmental assessment procedures Development of provincial capacity for monitoring and enforcement Implementation of mass awareness programs with regard to environmental protection Development of a comprehensive and well-prioritized pollution control and EIA enforcement system	Enact the Environmental Protection Law Develop an action plan for the finalization and promulgation of NEQS and their implementation at the national and provincial levels Develop provincial capacity in implementing EA procedures, monitoring and enforcement Develop a policy framework for mass environmental awareness

6.3. Project level interventions

Table 7 provides a list of biodiversity projects in Pakistan in various stages of implementation and with potential for instituting economic and financial incentives for biodiversity conservation. The involvement of communities in formulating and implementing these incentive measures will ensure effective protection and sustainable resource use.

Table 7: Biodiversity projects (IUCN-GEF)

Project	Description	Economic Incentives
Mountain Areas Conservancy Project (MACP)	Aims at mitigating threats to biodiversity in the Himalayan, Karakoram and Hindukush ranges of Northern Pakistan. The focus is on empowering local communities to manage ecosystems and wild resources	Trophy Hunting Endowment Fund for Community Conservation Activities
Protection and Management of Pakistan Wetlands Project	Proposal Development Stage	
Conservation of Four Representative Protected Areas of Pakistan through Community-Based Management (PAMP)	Enhance and upgrade national effort to conserve biodiversity through community-based management.	The Project is in its preparatory phase, and will include economic incentives for the conservation when it comes on-line
Conservation of Balochistan Junipers through Community Participation	Assist in conserving the juniper forest ecosystem	The project is in its preparatory phase and will introduce economic incentives for conservation
Conservation of Habitats and Species of Global Significance in	Maintain or increase biodiversity and ecosystem productivity through community-based	The project is in its preparatory phase and

Arid and Semi-Arid Ecosystems in Balochistan	management	will introduce economic incentives for local communities for conservation
Sustainable Management of Chilghoza Forest Ecosystem in the Suleiman Mountains	Pipeline Project	This Project will also have a strong component of community participation and will introduce economic incentives as well
Ethnobotany Project, Ayubia	Assessment of herbal and medicinal plants in the Ayubia National Park. Ensuring their sustainable use through community participation	Documentation, valuation and sustainable use.

Source: UNDP, 2001

Trophy hunting is one among many specific incentives designed for species preservation. Box 4 and Box 5 catalogue two recent initiatives. They also demonstrate the centrality of resident communities in species preservation. As managers of such programs, communities also become the beneficiaries and are less prone to be predators.

Box 4: Trophy Hunting as a Mechanism for Biodiversity Conservation[1]

Trophy hunting is a form of sport, which is as old as hunting itself. Trophies are invariably males, and the animals most frequently considered, as trophy species are ungulates. Trophy hunting usually involves a hunter seeking the largest individual in a taxon or geographic area. Evidence suggests that in the short term, there are few if any negative effects of trophy hunting. This is to be expected, at least where the majority of mature males are not hunted.

The value of trophy hunting in conservation is that hunters are willing to pay relatively large sums of money for the privilege of hunting trophy animals. The money earned is used to conserve the population from which the trophies are taken. An additional. although more difficult, objective is population and habitat restoration, creating a protective umbrella for biodiversity in general.

For many species, the single biggest threat results from activities of an ever-increasing human population resulting in habitat destruction and over-harvesting. Thus, an important factor important factor in the success of biodiversity conservation is a change in people's attitude towards wildlife. It is also recognized that that lasting change is often achieved most readily if accompanied by benefits to provide positive enforcement. Properly designed trophy hunting programs have the potential to provide positive benefits, provided these benefits reach the people most 'central' to conservation efforts and protect the environment. However, equally important, the function of trophy hunting is not the generation of money or provision of benefits to the community, but the conservation of wildlife and their habitats. Community-Based Trophy Hunting Programs (CTHPs) will be effective only when benefits received from the hunts result in conservation efforts by the community, which in turn increases the size and quality of the hunted population; creates enhanced opportunities for trophy hunting; and provides broader environmental benefits.

Institutional Arrangements for Trophy Hunting

A total ban on big-game hunting – though more honored in the breach than in the existence -- exists in Pakistan, except for hunts allowed in the CTHPs. The government body responsible for regulating harvests of CITES and non-CITES species is the National Council for Conservation of Wildlife (NCCW). The NCCW has the vital role of helping the GOP meet recommendations made in CITES Conference of Parties (COP) and ensure adherence to other international conventions. Hence, the NCCW has a lead role in ensuring that provincial governments and NGOs promote and support activities, which meet Pakistan's agreements. In accordance with COP 10, NCCW allocates quotas for CITES listed species, which currently allows for 6 *markhor* hunts a year. This quota is based on information provided in the *markhor* conservation plans, submitted by the provincial governments. The communities, in conjunction with an NGO, the provincial wildlife department, or both develop these plans. Hunting allocation for *urial* (subspecies in CITES Appendices) is also made by the NCCW on a community-specific basis. NCCW also allocates hunting quotas for Asiatic *ibex*, but here the allocation is to provinces not to specific CTHPs. The provincial governments make community specific allocations. The quotas are supposed to be based on population data, but

this has not always been the case. In addition, political considerations play a part in allocating *markhor* quotas with a view to provide benefits across provinces.

Box 5: Trophy Hunting Programs in Pakistan

The first trophy-hunting program in Pakistan was the Chitral Conservation Hunting Program (CCHP) for *markhor*. The program was initiated by the NWFP Forest Department in 1983. It was not a community-based program since all the proceeds went to the government. The program lasted for 8 years before the GOP banned the export of trophies along with all big game hunting throughout Pakistan. The program earned about USD 250,000 in fees through 16 approved markhor hunts.

The longest running CTHP in Pakistan is the Torghar Conservation Project (TCP), established in 1986 on tribal lands in the Torghar range of northwest Balochistan. The program was set up in response to concerns about the declining [populations of the *Suleiman markhor* and *Afghan urial*. In 1994, the TCP was formally registered as an NGO, Society for Torghar Environmental Protection (STEP). In its first ten years, the program earned USD 460,000 from 14 *markhors* and 20 *urial* hunts. STEP employs 55 local game guards from several sub-tribes living in the area.

The second real CTHP was initiated by WWF-Pakistan in 1989 in the Bar Valley in the Northern Areas. The focus of the Bar Valley Project (BVP) was the *Himalayan ibex* population, which was in danger of extinction. The third CTHP was initiated under the IUCN-Pakistan implemented Mountain Areas Conservancy Project (MACP).

Mechanisms for Marketing and Community Participation

The NWFP Wildlife Department is the only provincial wildlife department, which has played a role in marketing of hunts. While in Balochistan and the NAs, NGOs have taken the lead role in marketing the hunts on behalf of the communities.

Currently, in all three provinces, the total hunting fee is fixed by the NCCW. Until 2000, the fees were divided, with 25% going to government (as license fee) and 75% to the communities (as trophy fee). The NCCW has now changed this to 20% and 80% respectively.

All communities with CTHPs are directly involved in data collection, primarily through their village wildlife guards who survey populations in cooperation with NGOs and/or government personnel. Few if any communities are involved in marketing hunts, but they are directly involved with the conduct of the hunts. If these CTHP programs are to be made sustainable, communities will need to play a major role in marketing hunts through direct negotiations with outfitters/hunters. NGOs will need to train and equip the communities for carrying out this task.

Despite the lack of systematic population data, cautious optimism is possible about the impacts of the CTHPS on *markhor* and *ibex* populations in Pakistan. Three factors lead to this optimism:

- Poaching has been significantly reduced in most, if not all, areas with CTHPs
- Many of the communities are reducing the number of sheep and goats they keep - sheep and goats being major competitors with wild caprins for food
- Community attitudes towards wildlife are changing - becoming more positive and accepting the need for conservation

6.4. The institutional prerequisites

Attempts to address price distortions at the sector level are rooted, ultimately, in political will, a difficult proposition as this entails resisting vested interests. This is true, whether it applies to removing price distortions (energy, irrigation water, fisheries), reducing perverse incentives (forestry) or attempting to deal with market failure (industrial pollution). Political commitment, in turn, ensures that the requisite laws and regulations are amended suitably. One key enabling factor, which needs to be enshrined in the laws is provision for joint/community-based resource management. This is a crosscutting requirement, whether it is with respect to forestry, protected areas management or fisheries. In particular, the long-term sustainability of project initiatives will always be at risk in the absence of an enabling institutional climate.

The forestry sector serves as a classic example of the incentive-institutional-degradation nexus.

6.4.1. Incentive incompatibility in the forestry sector

The term incentive compatibility refers to a situation where "the incentive faced by an individual [organization] is such that s/he automatically and voluntarily does what society wishes him/her to do" (Enayatullah: 1: 1993). In the forestry sector, a combination of ambiguous property rights, increasing monetary incentives and weak management have caused social and individual objectives to diverge and created a system of perverse incentives.

Colonial governments, driven by the need to mine these resources for development/ commercial purposes, weakened community rights to the use of forest resources. Usufruct rights continued to remain but were heavily proscribed. The objective of revenue maximization coupled with hostility to communities continues to this day in the management style of the provincial forest departments. Community management traditions, already fragile, have eroded further with new opportunities for employment and out-migration. Also, as mentioned earlier, demographic and development pressures have forced communities out of their ancestral lands into marginal areas where competition for resources is severe, resulting in further violations of indigenous property rights. The situation is increasingly marked by conflict, with communities forced to act as predators rather than as guardians of the commons.

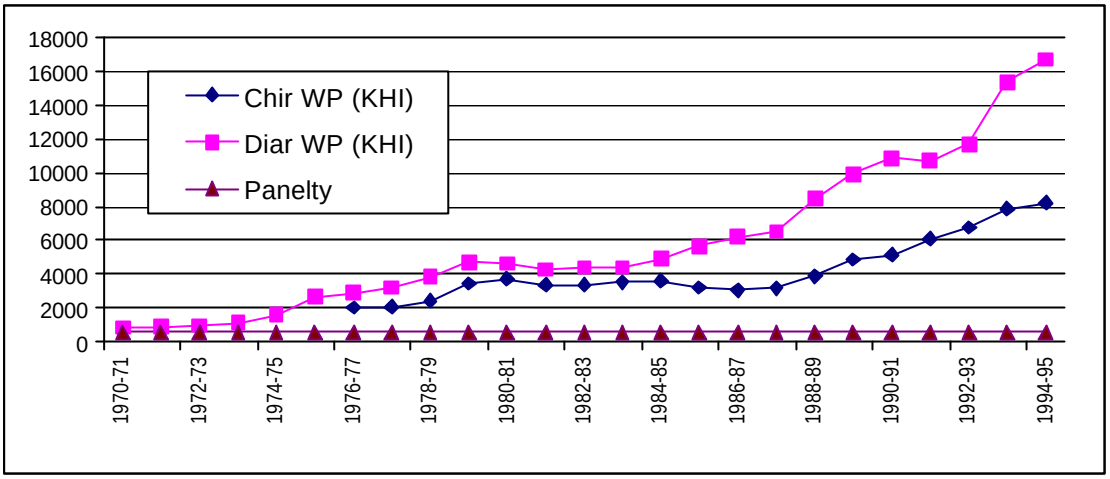
Weak property rights increase fears of expropriation by powerful groups, fuel insecurity about future earning streams, especially in an inflationary environment and, in general, give rise to concern about the free rider problem, namely, that forests will disappear no matter what the community might do (Inayatullah: 1996). Even in privately owned forests (guzaras) "right holders may see in regeneration a reintroduction of state property rights, which may stifle even natural regeneration." (Azhar: 1993).

Forests meet the subsistence needs of communities in the form of fuel wood, timber fodder, medicinal and edible plants and as a potential source of agricultural produce, via conversion to cropland. There is little doubt that the pursuit of such needs has made severe inroads into forest resources. However, is equally clear that organized and commercial timber extraction poses an equal if not graver threat. The involved groups are large forest owners-cum politicians, timber contractors and influential community representatives. Their depredations are in direct proportion to monetary incentives, represented by rising prices of timber products. Such groups tend to collude with the forest department staff for mutual gain and profit. While good governance was generally not a problem under British rule, present departmental incumbents have seen erosion in their standards of living, which has made them vulnerable to financial inducements. Also, the risks associated with trying to curb an increasingly lucrative business coupled with the prospect of illegal gratuities makes it difficult to resist the latter. Other factors contributing to the decline in professional integrity and competence are the politicization of appointments, inadequate training and lack of offsetting non-monetary incentives.

In addition, the rules and regulations tend to be inflexible and lack transparency; for instance, fines and penalties have not kept pace with rising prices of timber and are applied selectively, making violations less onerous. Also, permits tend to be distributed in a discretionary manner.

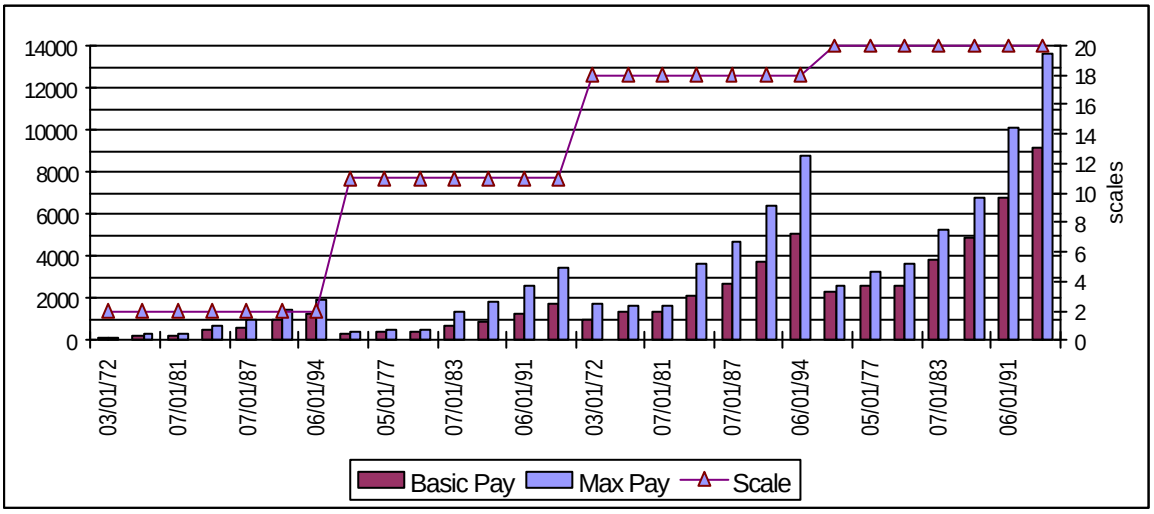
Data in support of these arguments is presented graphically below. The first (Figure 3) shows the diverging trend between timber prices and fines and penalties. Figure 4 tracks forest department staff salaries over time.

Figure 3: Whole sale prices of Chir and Diar (Rs/Cubic meter) in Karachi Market Vs Penalties



Although not substantially higher in real terms, rising timber prices in and of themselves create the impression of money illusion. Coupled with stagnant fines, their discretionary application and the scarcity premia attached to forest permits, they give rise to a highly perverse structure of incentives, one that is inimical to conservation. Corruption is an added factor, partly rooted in low government salaries. Nominal salary increases have been both discrete and shown little real term gains. Compared with other sectors (private organizations, donor agencies, semi-corporate bodies) the trends are even more adverse.

Figure 4: Salaries of scale 2,11,18,20 (1972-94)



The negative environmental externalities caused by deforestation are well known, namely, watershed destruction, dam silting, river sedimentation and flooding. Capturing such effects by imposing a monetary cost on timber extraction (stumpage fees), fuel wood collection, land use changes, and development encroachments is an effective way of rationalizing such activities. However, such internalization of environmental costs is not only technically difficult (valuation problems), it also threatens to make inroads into economic profits and, hence, is likely to face political resistance. Box 6 illustrates the inequitable and unsustainable aspects of the system of forest royalties in the NWFP and the Northern Areas.

BOX 6: Forest Royalties in the North West Frontier Province (Knudsen: 1995)

Forest royalties are at the very core of the problem of perverse incentives. With the enormous financial stakes involved, most of the revenues tend to get skimmed off before reaching the communities. The system is not only inequitable but is designed to promote deforestation rather than conservation.

In both protected and guzara forests, where communities have legal rights to forest resources, the net revenues (after deducting costs) from timber sales are split between communities (royalties) and the government. The distribution is as follows:

Prior to 1981, the fixed price system was adopted, where the concessionaires were paid a fixed price per cu. ft. of the harvested volume. The problem with this system was that it did not keep pace with the rising price of timber.

Subsequently, the system was replaced by the net-sale system. Under this system, the harvested timber is auctioned at timber markets. The net proceeds are then divided between communities and the government, with the community share ranging from 60% – 80%. Ideally, this allows communities to get the benefits of rising prices

In effect, the system is iniquitous and is manipulated for profit by the timber contractors, who in their capacity as large forest owners, elected members and community representatives carry considerable political clout. The forest department colludes actively in the manipulation of the system. Some common malpractices are:

After being awarded a logging tender the contractor deliberately delays logging in the specified block (coupe) in anticipation of rising prices because he has the financial means to engage the forest department in extended lawsuits.

Using the clout of local notables, timber contractors obtain powers of attorney for the village concessionaires for the collection of royalties from the government. These royalties are retained after payment of a pre-agreed amount to the local notables and forest department staff.

Under the net-sale system, timber contractors buy up royalties from local communities for a fixed price slightly above the old fixed rates (Rs.50 per cu.ft.) -- communities are willing to forego higher but delayed payments for quicker upfront disbursements. Subsequently, the contractor bids for the contract under an assumed name. He also has an incentive to log more than the agreed volume (facilitated by bribing forestry department staff), as this means more royalties for him.

While, admittedly, these malpractices are possible due to loopholes in forest legislation, the politically powerful contractor networks not only enjoy immunity from the law, they also resist attempts at legal reform which would close such loopholes.

Also, in addition to benefiting the contractors at the expense of poor communities, the system is clearly geared for maximum destruction. An alternative system (Inayatullah: 1996), "involves a change in the formula of payment from royalties to income; in other words, owners receive an annual payment based on the number of trees standing in their area, not on the number of trees sold." Implementation of such a system pre-supposes extensive documentation and information about existing stands. More generically, it is premised upon the requisite political will.

7. Biodiversity-Economics Linkages: A Suggested Framework for Integration

7.1. Valuation

The main recommendation is that the Ministry of Environment should choose an index of environmental quality. This choice would help guide the data collection efforts by providing a clear goal. This study recommends the choice of the *cost of environmental degradation* as the appropriate index. It brings out the costs in a manner that is likely to be understood readily by the policy makers and the public and provides a *raison d'être* to the work of the ministry and its affiliated agencies.

Second, the Ministry should put together an annual report on the state of the environment. This report should present the above analysis on the cost of environmental degradation. In order to have credibility, this report should, however, be presented by an independent agency, on behalf of an environmental consortium. The report should be presented in a public forum, such as a conference and be subjected to advice or criticism.

Third, the annual report should contain a statistical appendix with time series data on environmental variables. The Federal Bureau of Statistics should prepare the statistical compendium at the behest of the Ministry and its partners. The compendium should be organized around the needs of the report and not the other way around. For this purpose, the Federal Bureau of Statistics should be given a pilot grant to incorporate the collection of environmental statistics in its standard survey processes, including the PIHS, PDHS, HIES, and others. Also, the Federal Bureau of Statistics be provided with a grant to conduct a periodic census of environmental organizations.

Fourth, the report should be used on a regular basis by the Planning Commission and the Ministry of Finance for the purpose of incorporating environmental information into the national accounts. It should be readily accessible by the federal and provincial line departments, the planning and development departments as well as the multilateral and bilateral donor agencies for the purpose of formulating sector pricing policies, undertaking cost-benefit analysis of investments/project and carrying out IEEs and EIAs. The latter should become an integral part of all planned investments and projects, whether intra or cross-sector, environmental or non-environmental. Of course, in this context, additional environmental data should be generated at the investment/project level, as and when required.

Fifth, and given the comparative advantage of the World Bank in data organization and analysis, it should consider regular environmental data collection, its organization and valuation as a high priority issue. With this in mind, it should strengthen the capacity of the federal and provincial bureaus of statistics to undertake collection of this information on a regular basis.

7.2. Economic policies: an Action Impact Matrix

Economic reform polices and their institutional adjuncts should be seen as a two-stage process. They are important tools for environmental and biodiversity conservation. In their absence – namely in the presence of economic distortions and institutional vacillation – the potential for degradation is very high. Some of these effects are evident in Table 8, which looks selectively at a few sectors.

Table 8: Indicators and Causes of Selected Environmental Problems in Pakistan

Environmental Areas of Concern	Bio-physical Indicators	Socio-economic Indicators	Underlying Causes: Economic Polices, Prices and Institutions	Environmental Implications
Energy Generation and Conservation	Declining stocks of fuel wood, dung and crop residues. Biomass used primarily in rural areas and in low income urban settlements Energy generated from hydel and thermal sources. Declining gas supplies forcing substitution towards 'dirty fuels' such as petroleum and coal. Secular decline in the share of hydel in total power generation. Limits to additional hydel power generation imposed by surface water flow and environmental constraints	Country relies substantially on imported oil, price of which tends to fluctuate Inequity in energy distribution. Rural areas not on national grid. In urban sector, low income settlements have limited access to electricity and gas connections High transmission and distribution losses. Also, erratic supplies due to reduced water flows in large dams during dry months. The incidence of load shedding inequitable, ffecting rural areas and small towns to a much greater degree. Resultantly, growing reliance on captive power (generators in domestic and commercial sectors) and self-generation in industry.	Cross-sector subsidies in electricity and gas pricing. Both produced below long-run marginal costs of production. Petroleum product price differentials and grading encourage adulteration (diesel with gasoline, high and low grades of gasoline) WAPDA and KESC, the two major electricity suppliers, afflicted with typical public sector symptoms, in that they are overstaffed, need regular government bailouts are technically inept and managerially incompetent. Similar problems afflict OGDC and Sui Northern and Sui Southern. All slated for complete or part privatization Regulatory institutions, set up to oversee energy pricing, investment and privatization, weak and ineffective	Emissions and ambient air pollution leading to global warming. Adverse impact on forests and biodiversity
Agricultural Land Conversion and Degradation	Irrigation covers 79% of total cropped area and contributes to nearly 90% of total agricultural output Emerging land and water (both surface and ground) constraints. However, considerable remaining potential for cropping intensity increases.	Sixty five percent of the population rural. Agriculture accounts for more than 25% of GDP and is the primary source of both employment and exports. Agricultural incomes depressed due to adverse terms of trade for agricultural commodities Increasing marginalization of the rural poor due to policy and	Prices of agricultural commodities not in line with border prices and differentials vary across commodities. Subsidies on chemical inputs, although lower, still provided either for the final product (pesticides) or on inputs (natural gas for fertilizer production) Additionally, subsidies provided on electricity consumption (tube wells) and use of canal (surface) water for	Exacerbation of water logging and salinity as a result of increased water retention in the river ecosystem Soil degradation and water pollution caused by seepage and runoff of chemicals (fertilizer, pesticides) Pressure on natural resources (deforestation, rangeland degradation, biodiversity loss) due to the marginalization of the poor, as a result of discriminatory

	Declining freshwater outflows to the sea to sustain coastal resources (mangroves, fisheries) Increasing water retention in the Indus Basin ecosystem, already afflicted by a lack of natural drainage High agricultural yields, thanks to intensive chemical input (fertilizer, pesticides) applications beginning to level off. In some areas the use of these inputs actually causing yields to fall via soil degradation and water pollution	institutional biases, land consolidation and environmental degradation Highly inefficient use and inequitable distribution of water resources. Public sector institutions, which dominate procurement, distribution and export of agricultural commodities and inputs, inefficient and financially insolvent	irrigation. Price charged for use of water well below costs of maintenance and rehabilitation of the irrigation infrastructure. Furthermore, revenues generated transferred to the general pool rather than being retained for O&M. Poor farmers lack access to subsidized inputs, farm machinery, government procurement and storage facilities Government subsidies perpetuate insolvency and inefficiency in public sector corporations. Lack of accountability fosters corruption, and neglect of poor farmers in service provision	government policies and land consolidation Coastal resources degradation (mangroves, fisheries) resulting from reduced freshwater outflows to the sea.
Trade and Environment		Capital intensive and obsolescent technologies used in industrial production High and pervasive industrial inefficiency Production patterns not aligned with country's comparative advantage Adverse terms of trade (export bias) against agro-processed goods Excessive use of pesticides in cotton production encourage Impoverishment of agricultural sector in general and rural poor in particular Lack of employment opportunities, both in industry and agriculture	Trade policies foster high levels of industrial protection Differential protection engenders an anti-agricultural bias Trade policies inward (import substitution) rather than outward looking (export promotion) Relaxed quality control standards on pesticide imports combined with a steady reduction in import duties, in conformity with IMF-World Bank conditionalities	Industrial effluent and air emissions from smokestack industries contributing to water and air pollution Excessive use of fertilizers and pesticides (the latter particularly in cotton production) has direct (health) and indirect (soil and water quality degradation) environmental impacts

As indicated earlier, the IMF/World Bank economic reform agenda addresses environmental/biodiversity concerns indirectly through various pricing and budgetary initiatives. Recent years have seen the introduction of direct measures, mostly of an institutional nature. However, the risk exists that these reforms can create as many new environmental problems as they remedy.

The critical need is to ensure that the reforms are appropriately sequenced and integrated. For instance, macroeconomic stabilization and investment policies, which promote growth, are synonymous with various forms of pollution and degradation. Examples are increased air and water pollution, deforestation and, directly, biodiversity loss. In order to mitigate the adverse environmental consequences of growth, price subsidies need to be removed or, in some cases, environment-specific incentives provided (as in the case of deforestation), or price rationalization where they do (such as price subsidies on energy and water use). Additionally, new charges need to be imposed to account for external costs, reflecting market failure.

The following sections examine sequencing and integration issues in more detail.

7.2.1. The need for integration and sequencing

Environmental considerations also make it necessary to adjust the timing and sequencing of macroeconomic and sector policy reforms. Consider a typical case where a country is facing both a high budget and current account deficit. Trade liberalization, which precedes internal adjustment measures, such as removing subsidies, can aggravate environmental pollution, thanks to increased foreign investment lured by such subsidies (e.g., energy). Also, stabilization measures can have short-term contractionary effects, which may be environmentally harmful. Thus, fiscal austerity in the social sectors can worsen poverty and increase pressure on the environment. Or, there may be direct cutbacks in allocations for environmental programs. The changing cost calculus implicit in environmental impacts suggests care in instituting such cuts.

7.2.2. Action Impact Matrix (AIM): A tool for analysis

Although less rigorous than a formal modeling exercise the AIM is a useful organizing framework for articulating policy-environment linkages. The AIM makes it possible to 'promote an integrated view meshing economic decisions with high-priority environmental and social impacts' (Munasinghe: 1996). The focus is on broad relationships rather than quantifiable impacts, as in modeling exercises, although the relative intensity of impacts can be assessed qualitatively. Following from there, the AIM provides a range of economic, social and institutional options for enhancing positive environmental impacts and mitigating negative ones. It is also a useful framework to prioritize and sequence economic policy reforms. A simple template for an AIM is presented below in Table 9. Table 10 presents a more detailed AIM for Pakistan.

Table 9: Action Impact Matrix (AIM)

Activity and Policy	**Main Objective**	**Matrix of other impacts on key sustainable development issues**			
		Land degradation	**Air pollution**	**Water pollution**	**Solid waste**
Macroeconomic and sector policies	**Macroeconomic and sector improvements**	**Positive impacts are due to removal of distortions; negative impacts mainly due to remaining constraints**			
Exchange rate	Improve trade balance and promote economic growth	(-M) Encourage deforestation and exploitation of natural resources	(-M) Increase air pollution	(-M) Increase water pollution	(-M) Solid waste accumulation
Budget balance	Reduce inflation	(+M) Reduce deforestation via reduced inflationary expectations			
Energy - eliminate subsidies	Improve energy use efficiency		(+H) Reduce air pollution		
Irrigation – eliminate subsidies	Improve water use efficiency	(+H) Reduce land degradation (water-logging and salinity)			
Industry – reduce import tariffs	Improve input use efficiency and quality		(+M) Reduce air pollution	(+M) Reduce water pollution	
Complementary measures	Reverse negative impacts of market and institutional failures				
Address market failure		Stumpage fees, royalties based on tree stands	Pollution charges	Pollution charges	
Institute legal, regulatory reforms		- Property and tenure rights - Participatory management - Commercial water distribution	Improved monitoring and enforcement capability	Improved monitoring and enforcement capability	- Private sector management - Community based management

Source: **(Munasinghe, M: 1996: 31)**

Notes: + or - H = High positive or negative impacts

+ or - M= Moderate positive or negative impact

As can be seen in the matrix, the first column includes the entire range of conceivable policy and institutional options. The second column focuses exclusively on the economic impacts of such policies and measures at both macro and sector level. The remaining columns assess their impacts on environmental sustainability (illustratively represented by air and water pollution, land degradation and solid waste generation). Viewed laterally, positive economic benefits can accrue concurrently with adverse environmental impacts, as in the case of exchange rate reform. The vertical coordinate presents offsets to such adverse impacts in the shape of sectoral and complementary policies. Thus increased air and water pollution, reflecting the growth enhancing effects of exchange rate reform, can be counterbalanced by improved energy pricing, pollution charges and improved monitoring and enforcement of environmental regulations.[8]

By way of illustration an AIM for Pakistan has been developed for a few sectors.

[8] Note that the environmental benefits are implicit in the complementary measures indicated

Table 10: Pakistan Action Impact Matrix

Economy wide Policy Reform Goals/ Instruments	Sustainable Development Issues					
	Urban and Industrial Pollution	**Forest and Biodiversity Protection**	**Agricultural Land Conversion and Degradation**	**Energy Generation & Conservation**	**Water Resources Depletion and Degradation**	**Trade and Environment**
Sectoral/Inter-sectoral Price and Institutional Reforms Resource Access, Rights and Tenure, Participatory Management, Partnerships	Strengthen existing and innovative partnerships (NGOs, private sector, and government) to formulate and implement national environmental quality control standards Strengthen cross-sectoral arrangements (such as the PEP partnership) with a view to formulating and leveraging environmental policy reform		Water rights, legalized trade in water, in conjunction with water pricing reform and decentralized management ensures more efficient use of water, thereby reducing water logging and salinity problems and increasing freshwater flows to coastal zones Water users' associations, improved access to credit, inputs, water, farm machinery and energy preserve small farmer interests as well as enhance income, thus reducing pressure on natural resources Improved security of land tenure creates incentives to reclaim and improve agricultural land and to use it more efficiently	Strengthen existing and innovative partnerships (see Urban and Industrial Pollution)		Improve coordination between government bodies (Environment and Commerce ministries) and international environmental NGOs (IUCN, WWF) to improve flow of information on global environmental regulations and consumer/business preferences in developed countries Strengthen existing partnerships (see Urban and Industrial Pollution)

Price and Subsidy Reforms			Reduced subsidies on chemical fertilizers curbs indiscriminate use and reduces the incidence of soil and water degradation as well as adverse health impacts Water pricing reform (pricing water consumption) encourages water use efficiency and generates resources for the government Eliminating subsidies on raw materials (natural gas for fertilizer production) and electricity lowers greenhouse gas emissions and reduces ambient air pollution, with beneficial health impacts Rationalizing output prices ensures higher incomes for farmers in general and small farmers in particular, and reduces pressure on natural resources	Rationalizing energy prices and elimination on intra-fuel price differentials encourages energy use efficiency and fuel substitution towards less polluting fuels		Reduce fertilizer subsidies (See Agricultural Land Conversion and Degradation)

	Urban and Industrial Pollution	**Forest and Biodiversity Protection**	**Agricultural Land Conversion and Degradation**	**Energy Generation & Conservation**	**Water Resources Depletion and Degradation**	**Trade and Environment**
Privatization Improve efficiency in use of resources (e.g. financial reforms and hard budget constraints)			Privatization/corporatization of procurement, distribution and exports, within an appropriate regulatory framework ensures better access of inputs and services to small/poor farmers and reduces pressure on natural resources Decentralized irrigation systems management in conjunction with pricing and legal reform has environmentally beneficial impacts	Privatization/corporatization/unbundling of energy utilities. Strengthening of regulatory agencies set up to oversee energy pricing, privatization and investment in the energy sector. These measures are conducive to energy use efficiency and reduction in transmission and distribution losses.		
Promote private investment	Reduce volume and concentration of pollutant loads by a combination of in-plant (efficiency) measures as well as external end-of-pipe treatment		Investment in provision of public goods (drainage, soil reclamation) reduces soil degradation. Ensure funds raised through pollution charges (pesticide tax, water logging and salinity charges) allocated to environmental mitigation, research	Private power production promotes energy use efficiency		Reduce volume and concentration of pollutants (see Urban and Industrial Pollution)

	Urban and Industrial Pollution	**Forest and Biodiversity Protection**	**Agricultural Land Conversion and Degradation**	**Energy Generation & Conservation**	**Water Resources Depletion and Degradation**	**Trade and Environment**
Government Deficit Reduction Cut expenditure, reduce subsidies, undertake environment-friendly research			Government assured revenues from, subsidy reductions, water charges, land taxes, pesticide surcharge. Reduces pressure on budget and constitutes funding source for promotion of sustainable agriculture and land land reclamation initiatives Institutionalization of varietal (insect resistant varieties) and agronomic (IPM, ICM and organic agriculture) research coupled with assured extension linkages with small farmers both environmentally friendly and income enhancing.	Cut in energy subsidies generates resources for the government		Institutionalization of research on sustainable agriculture (See Agricultural Land Conversion and Degradation)
Introduce resource rent taxation and user charges			Full cost recovery for O&M) and land taxes respectively facilitate irrigation system improvements and encourage land reclamation	Fuel import surcharges promote use efficiency and lower mobile and stationary source emissions		
Introduce environmental taxes and fees (charges on environmental externalities)			Impose pollution charges (pesticide tax, water logging and salinity charges) Address moral hazard issues (enforce quality controls/ban dangerous pesticides)	Institute voluntary pollution charges		Address moral hazard issue (see Agricultural land Conversion and Degradation) Institute voluntary pollution charges

	Urban and Industrial Pollution	**Forest and Biodiversity Protection**	**Agricultural Land Conversion and Degradation**	**Energy Generation & Conservation**	**Water Resources Depletion and Degradation**	**Trade and Environment**
Trade Promotion Export promotion and foreign exchange liberalization						Statistical correlation demonstrated between export promotion in cotton textiles and trade and environmental degradation at both production and processing stages. Needs to be countered by domestic, mitigation policy measures
Reduce tariffs and other trade barriers	Associated with imports of more efficient and environment- friendly production technologies. However absolute pollution levels may increase with rapid sect oral growth, which will require additional offsetting domestic policies			Encourage imports of modern fuel efficient technologies		Lower tariff barriers associated with imports of clean technologies (see Urban and Industrial Pollution)
Industrial Promotion Reduce special industry programs and investment subsidies						

7.3. Project level incentives

There are two aspects to establishing sustainable incentives at the project level. The first relates to the kind of incentives, which would create a willingness among communities to conserve biodiversity. The second concerns the sustainability of such incentives. How can it be ensured that these incentives will remain in place after project closure? The answers are not simple. A mere cataloguing of measures does not serve any purpose. One needs to step back and examine the physical and institutional context before formulating them. Otherwise, there is scant chance that they will be implemented -- least of all that they will be sustainable.

The approach has structural, legal and management aspects. Structurally, the protected areas need to be partitioned on the basis of conservation and development criteria. Clear property/tenure rights are a legal requirement. Sound management ensures that synergies are generated between the two.

There are many advantages to the habitat approach: among others, it generates economies of scale in protection; it reflects the 'public good' principal (protect the habitat and you protect many species); it deals with uncertainty (quasi option values); it takes into account the interdependence among species and; lastly, there are non-biodiversity benefits from habitat preservation (watershed protection, tourism, etc.). Basically, the issue collapses into one of 'land use'. A land use approach is also amenable to developing financial sustainability mechanisms. Protected areas in Pakistan fail to meet such criteria. The majority of protected (national parks, wildlife sanctuaries, game reserves) were created in the 1970s. On the whole, they are poorly managed, disregard ecological criteria and ignore community development concerns in adjacent areas, which gives rise to encroachment and conflicts.

A land-use approach is based on three things which, for convenience, may be called 'denial, 'substitution' and 'development'. First there is the core zone, a minimally disturbed ecosystem that is legally protected. Adjacent to it is the buffer zone where communities have minimal extraction rights to, basically, compensate for such rights denied in the core zone. The transition zone is one where management is active in socio-economic development activities. All three elements are integral to sustainable development -- in other words they promote community development. while ensuring that the natural resource base remains intact.

In analogous terms, reserve forests would constitute the inner core, protected forests the buffer zone and *guzara* forests the transition zone. These categories also define rights to forest resources, ranging from minimal in reserve areas to common and private property entitlements in *guzara* areas. However, in order to capitalize on such a coincidence, certain institutional constraints have to be addressed. Success in accomplishing this is the key to financial sustainability.

If tenure is insecure and the government denies community rights to forest resources, communities will have no reason to participate in protected areas management. The lack of secure tenure leads to over-exploitation of resources, also known as the "tragedy of the commons." In fact, before the forests were appropriated and their management centralized by the colonial rulers, there was an indigenous knowledge base built around using such forest resources sustainably.
As indicated earlier, existing forestry laws and regulations encourage and condone resource extraction on a scale that is unsustainable. The costs of extraction are low while timber and fuel wood prices are high. The penalties for infraction are light and kept that way by a nexus of large owners, forestry department staff and the timber mafia. The result is almost irreversible degradation and loss of biodiversity. Unless these laws are tightened, and perverse incentives removed, it will be almost impossible to bring communities on board. Lax laws also encourage predatory behavior by the communities.

Once the structural and legal pre-conditions are in place, the next stage is to focus on the organizational, research and communication aspects. These are meant to facilitate the implementation of direct incentive measures and entail:

- Establishing VOs and working through existing NGOs and CBOs
- Establishing community-private sector partnerships
- Carrying out surveys of genetic resources, which are of medicinal, subsistence and commercial value
- Imparting conservation education and training
- Nurturing and promoting traditional management systems

Natural resource management systems have declined with the advent of state controlled protected areas and the creation of centralized management agencies. If such traditional systems can be restored they would prove to be effective custodians and managers of biological resources. The IUCN Northern Areas Biodiversity Conservation project provides ample proof that this can be done.

7.3.1. Direct financial incentives and measures

A direct measure is referred to as the application of the principle of transferable development rights (TDRs). This involves providing annual, non-transferable permits/vouchers to communities to purchase timber, fuel wood and fodder in the open market. Such arrangements can become sustainable if: a) the allocations and their use are determined and managed by the communities and; b) the project provide funds for inceptions with a view to making the scheme self-sustaining eventually. For instance, operation of a revolving fund with the proceeds from timber royalties and sale of certified forest product would serve this purpose.

Green markets are another direct measure gaining popularity in the developed countries. These are markets for forest products (furniture, doors, flooring and veneer) with certification that the raw materials have been harvested sustainably. In order to establish such markets, a great deal of spadework has to be done at the project implementation stage. This involves:

- Consultations with a wide array of stakeholders: forest owners, community organizations, environmental groups and government representatives in a consensus building process
- Training in low-impact logging and extraction techniques
- Assistance and training in value-added processing for specific products
- Fostering linkages between producers and buyers
- Public advocacy campaigns for sustainable forest management and 'buying green.'

Other measures are:

- hunting (culling) of old animals, managed by communities. Hunting fees would be deposited in a fund for development activities
- revenues from local tourism and earnings from the controlled auction of birds and animals
- promotion of less land dependent crops
- marketing of processed timber and non-timber based products employment generation in services, such as eco-tourism and forest protection

8. Specific Recommendations

Efforts to address biodiversity loss are both sector driven and embrace the entire range of interventions -- legal acts, regulations, pricing policies and administrative measures. It is obvious that a holistic approach to biodiversity conservation needs to be adopted. However, there are limits to what can be attempted or accomplished, in view of the inherent complexity of the problem and the associated funding and information constraints.

Essentially, a phased approach should be adopted in establishing biodiversity-economic linkages. The means selecting any one of the areas critical to biodiversity conservation, namely, forests, water, air or soil. The selection should be based on criteria, enumerating in fairly broad (non-quantitative) terms, aspects as diverse as, costs to the economy, biodiversity loss, institutional and political feasibility of remediation, the scope for community participation, implications for equity, data availability etc.

Let us say forests qualify as the first choice. The attempt to establish economic-biodiversity linkages in this area entails the following:

8.1. Valuation

- Collecting and compiling all available data on forest resources of Pakistan in the different ecological zones. Carry out surveys of genetic resources, which are of medicinal, subsistence and commercial value
- Assessing forest degradation trends and their economic and biodiversity implications
- Proposing the modalities for generating data on a continuous basis
- Developing a valuation methodology consistent with the data that is available and likely to be generated. The methodology should be able to internalize watershed (erosion) and downstream effects (sedimentation, flooding), biodiversity loss and global warming impacts.
- Suggesting mechanisms for incorporating such data in the national accounts
- Enhancing institutional integration of disciplines (economics, natural sciences, social sciences, information technology) within organizations dealing with environmental protection and conservation.

8.2. Economic policies

Quantifying perverse incentives in juxtaposition with the negative external effects stemming from deforestation, with a view to making the incentive system more environment-friendly. This would require the following: information:

- Suggesting a system for collecting and maintaining forest wood and non-wood products on a continuous basis.
- Compiling information on the extant royalty systems
- Compiling information on FD salary structures
- Compiling information on administrative measures, such as fines and permits.
- Assessing exchange rate and tariff policies with a view to assessing their implications for the import/export of forest products
- Assessing financial and economic incentives (discount rates, subsidies) which make development in forest areas (tourism, residential construction) more attractive than forest protection

8.3. Project Level incentives

- Institute the principle of transferable development rights (TDRs).
- Explore possibilities for introducing ‘green’ markets in forest products

- Hunting (culling) of old animals, managed by communities. Hunting fees would be deposited in a fund for development activities
- Revenues from local tourism and earnings from the controlled auction of birds and animals
- Promotion of less land dependent crops
- Marketing of processed timber and non-timber based products employment generation in services, such as eco-tourism and forest protection

8.4. Institutional development

- Adopt the habitat (land-use) approach to protected areas management
- Establish secure property/tenure rights for resident communities as a pre-condition for participatory management of forests and protected areas.
- Institute joint forest management as a legal requirement in forest laws
- Establish VOs and work through existing NGOs and CBOs
- Establish community-private sector partnerships
- Impart conservation education and training
- Nurture and promote traditional management systems

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10. ANNEX I: Map of Pakistan Vegetative Zones

- Permanent snowfield and glaciers
- Dry alpine cold desert zones
- Alpine scrub and moist alpine
- Himalayan dry coniferous with ilex oak
- Himalayan moist temperate forest
- Sub-tropical alpine forest
- Sub-tropical dry mixed deciduous scrub forest
- Balochistan juniper & Pistachio forest scrub
- Dry sub-tropical and temperate semi-evergreen scrub forest
- Tropical thorn forest and sand dune forest
- Mangrove and littoral
- Sand dune forest

11. ANNEX II: Sector Reform with Environmental Implications

Efficiency Oriented Reforms	SECTOR REFORMS			
	Agriculture/Irrigation	**Industry**	**Energy**	**Infrastructure**
Price Measures	Adjust output prices in line with world prices. Eliminate subsidies on agricultural inputs (fertilizers, pesticides) Improve assessment and collection of water charges. Move towards full cost recovery for O&M	Complete price deregulation of industrial commodities.	Adjust *power tariffs* to achieve 40% self-financing of WAPDA's program. Price *petroleum* at equivalent border price to increase efficiency incentive and encourage new private investments in energy sector Pass through import price increases to consumer. Maintain *gas* price for industry, power and commercial sector at parity with domestic price of fuel oil. Eliminate cross-subsidies in electricity and natural gas pricing.	Urban Adjust water and sewerage tariffs Transportation Phase in adjustments in taxes, fees, user charges for road, rail, port and aviation. Deregulate bus fares
Privatization/ Corporatization	Allow private sector entry in procurement, distribution and imports of agricultural commodities and inputs Decentralize/privatize management of irrigation and drainage systems. (autonomous provincial irrigation development authorities, area water boards, water users associations) Privatize public tube wells in fresh ground water areas Restructure WAPDA's water wing and reorient its focus towards basin wide resource management	Deregulate industrial licensing and investment Simplify and clarify investment approval procedures and regulations, especially at the provincial and local level. Privatize industrial units and expand the process to new areas such as services and infrastructure.	Adopt a two-pronged approach: a) private sector investment in new energy facilities; b) initiate the restructuring and partial privatization of energy utilities. Separate WAPDA's distribution function from its generation and transmission functions Agree to framework allowing private power generation.	Urban Encourage private sector participation in urban services delivery, particularly water and waste water services and solid waste management services. Transport Start program for restructuring Pakistan Railways. Separate Railways Board from the Ministry of Railways and assist it in expediting the privatization process. Corporatize three railway core business units
Institutional Reform	Explore possibility of reforming land titling and registration process through computerization		Strengthen O&M of sector operations. Rehabilitate T&D system. Implement theft and loss reduction programs, intensify bill collection efforts	Urban Issue a policy statement confirming the role of local government as the prime urban institution for basic urban

			Institutionalize relations with IPPs. Establish regulatory units to govern pricing and investment licensing (NEPRA, PPIB). Distribution of licenses. Introduce gas regulatory act. Establish PEPCO to manage the restructuring process, to help with commercialization and efficiency improvement programs and to prepare the generation, transmission and distribution units for privatization. Formulate financial restructuring plan for KESC. Develop plan for restructuring and subsequent privatization of PSO, SNGPL and OGDC	services including oversight and regulatory functions. Prepare devolution plan for property tax evaluation and collection to the local government Issue policy statement for putting in place a regulatory framework encouraging private sector participation in urban services delivery, particularly water and waste water services and solid waste management services. Transportation Adopt a Highway Private Sector Policy and Institutional Framework to encourage private sector investment Establish a Railway Resettlement authority and a Regulatory Authority.
Financial Allocations/Investment	Funding for core investment program; study of water sector to refine investment priorities. Adequate allocations by provinces for O&M until transition to new system.		Formulate and implement of medium-term energy investment program based on least cost principles. Support financing arrangements to assure appropriate levels of investment. Accelerate development of domestic energy resources.	Urban Formulation of priority investment program. Transportation Implement public expenditure program. Improve balance between new investment, maintenance and rehabilitation; introduce modern planning and construction methods. Enhance allocations for rehabilitation and selective improvements of high priority road sections

	MACROECONOMIC REFORM	
	Fiscal Policy	***Exchange Rate and Trade Policy***
Growth Promotion	Fiscal reform is overarching and includes both crosscutting and sector reforms. Budgetary balance is conducive to growth because it curbs inflationary financing and expectations. More directly, tax reform is designed to improve the incentive structure (substitution of trade taxes with direct and indirect domestic taxes). Expenditure reform entails efforts to reduce non-productive expenditure (administrative, defense, debt servicing) as well as efficiency enhancing subsidy reduction efforts. Economic growth has direct environmental impacts as do the growth enhancing modalities, such as reduced inflationary expectations, changes in incentive patterns, expenditure rationalization and subsidy reduction.	Despite periodic setbacks, the government has consistently pursued exchange rate liberalization policies. The trade regime has also been progressively liberalized. Quota restrictions have been abolished, tariff reforms include both a reduction in the average rate as well as a narrowing of the tariff band, import bans and restrictions are being reduced and export incentives have been increased. *A flexible exchange rate policy gives the correct market signals for resource allocation. Trade liberalization enhances efficiency in domestic production and improves access and use of environmentally benign technologies*

12. ANNEX 1II: Checklist for Interviews

1. Why, when and by whom was the need for a Biodiversity Action Plan first articulated?
2. Which organizations (government departments) and individuals were involved in preparation of the BAP?
3. What was the extent of your involvement? What input(s) were you required from you or your organization/department?
4. What was the mechanism for consultation? How were action plans devised?
5. What kind of issues came up which you think are not reflected in the final document? Why not?
6. Were you satisfied with the outcome of the process? If not, why?
7. How many meetings/consultative sessions did you or your nominees attend?
8. Did the consultative sessions adequately address economy-biodiversity linkages? Were economic policy makers and planners, both from the environmental and non-environmental sectors, involved in the development of the BAP. Who were they and what was the type and extent of their involvement?
9. Were economic dimensions of biodiversity conservation measures discussed? What issues, problems and opportunities were identified? By whom?
10. Was the role of economic policies, incentives and disincentives, and instruments vis-à-vis biodiversity conservation discussed adequately? Were you satisfied with the level of economic analysis done?
11. What, in your view, are the nature of the economy-biodiversity linkages?
12. (Arif, a suggested framework to nudge – not lock in -- the respondents)
13. Quantifying environmental goods and services (green accounting), integrated resource management at the sector level, project level EIAs
14. The key focus should be on economic policy incentives (market failure, intervention failure, high discount rates, globalization, i.e. lack of markets)
15. Institutional preconditions (legal, regulatory, fiscal/financial) for making economic policy incentives work
16. Community role in getting incentives right and in implementing them – the need for consultation
17. Following the official adoption of the BAP by the GOP, to what extent and in which sectors have economic incentives/measures been instituted with a view to biodiversity conservation
18. Similarly, have macroeconomic and sectoral economic policies been able to accommodate biodiversity conservation concerns post BAP adoption
19. What in your opinion were some of the limiting/facilitating factors influencing the integration of economic policies, instruments, and incentives into biodiversity conservation measures?
20. What steps, in your view, need to be taken to insure greater integration of economics into the BAP?
21. Do you think the BAP is a 'realistic' document, i.e., given the conditions and constraints being faced by the government, can it be implemented? If not, why not and how can it be improved upon?

13. ANNEX IV: List of People Contacted

Name	Institution
Dr. Maqsood Anwar	Biodiversity Unit Head, MELG&RD
Abid Aman Burki	Professor of Economics, QAU
Amjad Zafar Khan	Manager, Project Dev. and IT Coordination, LEAD-Pakistan
Shahrukh Rafi Khan	Executive Director, SDPI
Najib Murtaza	Task Manage, Environment, World Bank
Mohammad Rafiq	Country Head, IUCN-Karachi
Chris Shanks	Head MACP, IUCN-Islamabad
Kashif Sheikh	Consultant, Biodiversity Unit, IUCN-Islamabad
Kaleemullah Shirazi	Deputy Director, Land and Water, MELG&RD
Asif Ali Zaidi	Head, IUCN-Islamabad

14. ANNEX V: Workshop on Economics and Biodiversity Conservation: Awareness, Review and Exploration

Held Margalla Motel, Shahrah-e-Kashmir, Islamabad, Pakistan, May 28, 2001

Workshop Coordinator, Dr. Kashif M. Sheikh, IUCN-Islamabad

14.1. Background

Pakistan is among a group of countries that are signatories to the Convention on Biological Diversity (CBD) It was signed in 1992, and ratified in 1994. The emerging discipline of Economics and Biodiversity is still in its infancy, even in the West. In order to provide a practical framework, IUCN – The World Conservation Union launched a new Environmental Economics Programme this year.

The GEF-UNDP-UNEP implemented Biodiversity Planning Support Programme (BPSP) has a mandate to provide assistance to national biodiversity planners as they develop and implement their National Biodiversity Strategies and Action Plans (NBSAPs). Under the BPSP, a series of studies are being carried out on key aspects of biodiversity planning related to national implementation of the Convention on Biological Diversity. One of these thematic studies aims to review experiences, lessons learned and ways forward in the use of economic measures in NBSAPs. This study is being co-coordinated by IUCN –The World Conservation Union.

The economics thematic study includes 4 components: an annotated bibliography of experiences, cases and lessons learned on the use of economics fro biodiversity planning; national/ regional; case studies on the integration of economics into NBSAPs; global workshop on the use of economics for biodiversity planning; and guidelines on using for biodiversity planning and NBSAPs implementation.

The national/ regional case studies on the integration of economics into NBSAPs are being carried out in South Asia, South East Asia, Eastern Africa, Southern Africa and South America, they aim to examine, in detail, how economic measures have been integrated into NBSAPs in countries in these regions.

The RBP (Regional Biodiversity programme) commissioned one case study to Pakistan entitled as ' **Integration of Economics into NBSAPs**. The Biodiversity Unit of the IUCN-P took this initiative and sub-contracted the study to SDPI (Sustainable Development Policy Institute) to prepare this national case study regarding the current status of biodiversity in Pakistan in the light of economic realities. However, Biodiversity unit provided support and technical advise to the researchers of the study at SDPI. The Global Environment Facility (GEF), the United Nations Development Programme (UNDP), and the United Nations Environment Programme (UNEP) are the donors for the Biodiversity Planning Support Programme. The mandate of this programme is to provide assistance to biodiversity planners as they develop and implement National Biodiversity Support Action Plans (NBSAPs).

In addition to the study one national workshop was organized by IUCN-P, to discuss the study. This workshop had different stakeholders who have been involved in the NBSAPs process and aim

to discuss the case studies and suggest ways forward. The results/ outcome from the workshop will then be feeding into the global synthesis.

14.2. Objectives

The objective of this workshop was to launch the national case study, and get feedback from economists, biologists, ecologists, conservation planners, agriculturalists, foresters on how to understand the linkages of economics and Biodiversity and in the light of this implement the Biodiversity Action Plan (BAP) in Pakistan.

14.3. Inaugural session

In his inaugural address, IUCN's Country Representative in Pakistan, **Mr. Mohammad Rafiq** welcomed the participants to the workshop. He said that the man on the street knows very little about the term "Biodiversity". Even less is known about its relationship to economics. He discussed questions regarding economics and biodiversity and how they are related. He was glad that participants came from a range of backgrounds, as traditionally the paths of economic analysts and environmental analysts rarely meet. He stressed the need for integrating biodiversity into Pakistan's economic plans and policies. This gap could only be fulfilled if economists and environmental experts from both backgrounds helped IUCN to set the agenda for the future.

Dr. Amjad T. Virk (Senior Biodiversity Specialist at IUCN-P) briefly introduced the Biodiversity Action Plan (BAP) for Pakistan. He said that biodiversity encompasses all species of plants, animals and microorganisms, their genes and the ecosystems in which they live. It refers to the variability among living things and is considered at three levels: species diversity, genetic diversity and ecosystem diversity. He stressed that biodiversity provides many goods and services to humanity, and is vital for life support systems. Indeed, the balance of all ecosystems is so delicate and fragile that the slightest disruption in one can cause devastation in the other. Citing the main causes of biodiversity loss, Dr. Virk mentioned habitat, species, faulty economic policies and the increasing demand for natural resources worldwide. Critically threatened ecosystems in Pakistan include:

- Balochistan's juniper forests
- Balochistan's rivers
- Balochistan's sub-tropical forests
- Chagai desert
- Chilghoza forests in the Sulaiman range
- Indus delta and coastal wetlands
- Indus river and wetlands
- Moist and dry temperate Himalayan forests
- Trans-Himalayan alps and plateau
- Tropical deciduous forests in the Himalayan forests

Dr. Virk explained that the BAP aims to promote the conservation and sustainable use of Pakistan's biodiversity, and the equitable sharing of benefits for the well-being and security of the nation. He said that BAP is currently a three-in-one document. It consists of the country study, a national strategy and an action plan. It sets out 25 objectives that address most of the articles of the CBD; proposes 143 specific actions to achieve them; and outlines the composition of bodies to coordinate BAP's implementation. Although the importance of economics and biodiversity linkages has been recognized, the linkages have to be defined by economic experts. Their have to help environmentalists fill in the gaps in the BAP regarding trade, market pricing on environmental resources, privatization and cost and benefit analysis.

Dr. Lucy Emerton (Head, IUCN Asia Region Environmental Economics Programme) gave the participants an overview presentation on the global and regional rationale for the national study on the integration of economics into biodiversity. As many of the participants were not economists by training, she also gave an overview of the economics of biodiversity. She presented information on NBSAPs, giving some background on Pakistan's national case study as well.

She pointed out that four activities have been completed with regard to NBSAPs and they give an idea of lessons learned so far. The first is an **annotated bibliography** for biodiversity planners. This comprehensive source of information has been regionally, thematically, and topically indexed. However, one issue is that biodiversity planners may not be aware of its existence. The second activity involved **regional case studies to examine how economics has been used**, what the successes and failures have been, constraints, etc. One case study was performed in **South Asia (Pakistan)**, South America, East Africa, and South East Asia. The third activity is a **global workshop** scheduled for June 20-22, 2001 in Ecuador. During this workshop participants, including both economics and biodiversity planners, will review cases. The fourth activity is **Best Practices guidelines**, anticipated for July 2001.

She also discussed the Convention on Biological Diversity (CBD) and specific areas where economics fits in. There are three pillars of biodiversity economics embedded in the Convention: valuation, incentives, and financial resources. Article 7 of the CBD deals with valuation; Article 11 deals with incentives; and Article 20/21 deal with financial resources. Article 6 covers NBSAPs, specifically economic strategies in NBSAPs. This information on the valuation, incentives and policies was given to the participants in the form of brief and handouts during the workshop (attached in the end as Annex I and II.

How is biodiversity economically valuable? How can biodiversity planning be justified in the context of other planning structures in Pakistan? Dr. Emerton posed these questions to the group, which led to a discussion of the economic benefits of biodiversity, including use and non-use values. Additionally biodiversity valuation, assessing economic benefits, was discussed. Some useful information she presented included a visual illustration of the contribution of biodiversity to a country's GDP, employment, government revenue, foreign exchange, and exports to different sectors within a country (e.g. rural, government, etc.).

Dr. Emerton further highlighted the importance of not only identifying the economic benefits of biodiversity but that costs will also be incurred in the conservation of biodiversity. Traditionally these have included management costs, but other activities are now being included in this type of analysis, such as opportunity costs. When the costs and benefits have been identified, they can be compared to the benefits to see who is really benefiting. However, in the example presented, the government sector had higher costs than benefits of biodiversity as government ministries and departments will ultimately be responsible for the implementation, etc. of biodiversity action plans. Therefore there is a need for such valuation, which will lead planners to identify economic incentives.

Article 20 of the Convention deals with financial resources. Potential financing mechanisms include new markets and charges, bio-prospecting, payments for services, investment and business, voluntary donations, debt swaps, and trust funds. What does economics add to biodiversity planning? It can give justification for conservation as well as provide incentives for the conservation of biodiversity.

The Chief Guest, **Mr. Mahboob Elahi,** Director General Environment, Ministry of Environment. Local Government and Rural Development, addressed participants and gave a general discussion

on biodiversity. He stressed that the BAP needs to be converted into an annual "action plan" for Pakistan.

14.4. Session 1: Integration of economics into Pakistan Biodiversity Action Plan

During the first session of the workshop, the National Case Study on the Integration of Economics into Biodiversity Action Plans and Studies was discussed. An analytical framework for Biodiversity Loss Assessment and Remediation was presented. General and specific recommendations were given at the end of the presentation.

During the question and answer period, participants raised several issues. The first question that was brought up related to the importance of agriculture in Pakistan and the production of cash crops (e.g. cotton). In order to grow cash crops, it is necessary to have very fertile soil and to grow more cotton for exports; farmers use more chemical pesticides and chemical manures (fertilizers). However, there are adverse impacts on the water cycle and on entire ecosystems. The participant who raised this issue also discussed the far-reaching consequences of such activities, using the insect infestation of blue pine as an example. The insectivorous bird population has declined dramatically over the past few years. He suggested that when the birds visit agricultural areas they are poisoned by toxic soils, etc.

Therefore, how can the government be convinced that the current practice of pesticide use must be changed because of the losses to biodiversity? The answer was that human activity is not going to be stopped, the impact of these activities must be minimized. The overuse of fertilizers is the issue, not their use in general, that leads to environmental degradation. The overuse is related to economic pricing policies and subsidies, water prices, etc. Additionally, as another participant highlighted, sustainable agriculture promotes activities with long-term benefits. The use of out-dated and banned pesticides, especially overuse is the problem. He stressed the importance of awareness of when and when not to use pesticides.

Comments were also made on the generality of the recommendations of the national case study. It does not touch on specific biodiversity issues, provides no methodology or data. This comment came up during this session in detail.

Another participant raised a question related to the conservation of biodiversity, especially microbial biodiversity. He highlighted two issues, the first being whether or not there is a technical solution to the problems? Secondly, if there is a technical solution, why is it not being implemented by farmers? The ensuing discussion revealed that there is a technical solution and it has been used and implemented by farmers and the use of pesticides did decrease for cotton crops. However, it is not awareness on the part of farmers that is an issue. The skill level, or technical competence, of farmers does not exist for the application of this technology.

Multi-nationals, and their role and contribution to problems in agriculture and thus biodiversity were raised several times, but discussion did not focus on this topic.

Genetic resources and their role in biodiversity were brought up by another participant. His main point was that it is crucial that there is an awareness of the biodiversity benefits of genetic resources. The response was that biodiversity valuation would aid in raising awareness of the value of these resources. Participants discussed how they could help define an agenda as to what should happen next. The most effective mechanism will be to highlight the contribution of biodiversity to GDP, etc.

Another question related to whether the removal of subsidies would stop environmental degradation? What about its link to poverty? Also what about the globalization of the economy and its effects on Pakistan? With respect to subsidies, their complete removal had not been suggested, rather a better application or targeting of subsidies. Additionally, subsidies are only one aspect of the issue. Regarding globalization, this is implicit in national policy formulation.

Specific recommendations for protected areas management were made during the presentation, particularly to adopt a habitat land-use approach (e.g. core areas). However, since Pakistan has no protected areas that fall into this type of management it is not relevant. This was not an approach for Pakistan, only a suggestion.

A question directed to Dr. Emerton related to environmental degradation and that nature is used to make economic profits. Are we ignoring other aspects of biodiversity which are intangible and equally, if not more, important? Dr. Emerton agreed that the economics of biodiversity is not to be mistaken with the commoditisation of biodiversity, which is purely financial.

Although the report was very general if it said that farmers overuse water resources at subsidised prices, then we are saying that the farmers are irrational. This generated a discussion and it was stated that the case study was not a valuation exercise – the World Bank conducted a study on valuing environmental degradation in Pakistan. Over-exploitation occurs when goods are not priced properly.

14.5. Session 2: Group work on policies, incentives and valuation for biodiversity conservation

Participants chose one of three discussion groups during this session – policies, incentives, or valuation. For each of the three groups, a list of questions was provided to guide/focus group discussions. The findings from each of the three groups have been summarized below.

14.5.1. Group 1 – Valuation

This group, moderated by **Usman Iftikhar** (Environmental Economist, IUCN-P), identified what valuation was and agreed that it was essential to biodiversity/environmental conservation. During the discussion, the group identified ecosystems that need immediate attention in Pakistan, based on priority. First, the group agreed that although they could priorities ecosystems, it is necessary to increase the understanding of ecosystems. The ecosystems included desert areas and coastal and wetland ecosystems.

Ways in which capacity in valuation in Pakistan can be promoted or built were discussed next. The group decided that understanding already existing capacities is required. Awareness raising surrounding economic valuation is also important. The group proposed the formation of a network of biologists, economics, environmentalists, etc. that would provide a forum for discussion and debate on the role of economic valuation of biodiversity. Additionally, involving government ministries, such as the Ministry of Finance was discussed, with the idea of presenting preliminary findings from valuations.

Different steps that can be taken to work towards making economic planners consider biodiversity values were also discussed. The group decided that approaching the BAP Secretariat and the Biodiversity Steering Committee were two ways. These involve major players in Pakistan, and are made up of different ministries, departments, NGOs, with a range of economics, biology, etc.

14.5.2. Group 2 – Policies

The group moderated by **Dr. Lucy Emerton** and **Dr. Kashif Sheikh** (Biodiversity Programme IUCN-P), identified certain policy issues regarding the economics of biodiversity. It was felt that

economic and biodiversity linkages need to be clearly defined. Awareness and training about the environment should be imparted at the primary educational level so that future generations can at least halt to some extent the momentum of environmental degradation in Pakistan. The specter of poverty at the grassroots level will, however, undermine all efforts for BAP's implementation. Concrete incentives must be given to the stakeholders and the community at large; if they have a stake in protecting the environment they will protect it. Questions were raised as to whether BAP complements the current Poverty Alleviation Programme of the government. The following policy issues were agreed after consensus:

- Benefit sharing at all levels: community; government; institutions such as universities and NGOs.
- Raise stakeholder awareness.
- Review of existing economic policies in the new light of biodiversity: The policies are there – their implementation is negligible.
- Awareness raising and implementation of those policies.
- In-depth statistical documentation on the knowledge the linkages between economics and biodiversity, to be prepared by economists.
- Identify a legal framework, which monitors and controls the issues of bio-piracy and bio-prospecting in relation to biodiversity.

14.5.3. Group 3 – Incentives

Arif Pervaiz (Research Associate, SDPI) facilitated this group. Issues discussed were: identification of possible gaps, previous successful events of biodiversity conservation through incentives, and more way to do it.

The group identified benefit-sharing, participatory management, trophy hunting and fuel-efficient stoves as some successful activities both from conservation and economics perspective.

The group agreed that incentives should be designed in such a way that they don't make the community dependent. Therefore, benefit-sharing and participatory management emerged as possible solutions. Complete funding of projects from external parties makes the community complacent and does not enable full participation. People tend to undervalue anything they get for free. Thus, to motivate them, they should be made the stakeholders.
Mostly, the focus (of this group) remained on incentives in northern areas-probably because most of the participants were working in these areas themselves.

The main issue centering this argument was: how to change peoples' behaviors when they are initially getting something free of cost. In other words, why should someone be interested in purchasing fuel wood at subsidised rates when he/she can chop it off for free? From here, emerged the need to educate people, especially the direct users/exploiters of nature about the possible threats to themselves of these exploitations. Thus, incentives and both disincentives need to link benefits of conservation directly with the economic needs of the community.
Equitable redistribution of funds and involvement of communities in decision-making were two other important points identified by the group. The concrete benefits of trophy hunting game as:

- Community's ownership
- Benefit sharing
- Awareness'
- Sustainability
- Capacity building

The specific advantages of FES came as:

- Integration of two development agencies
- Less consumption of space
- Appropriate design
- Realization of depleting supply
- Transparency
- Monetary incentives
- Community involvement

Disincentives: are important from the view of stopping undesirable activities.

14.5.4. Session 3: Towards an integrated approach

During this session participants presented their answers to questions during the previous session. Discussion on each of the topics followed. One thing that continued to come up was the argument of valuing the ecosystem versus a species of a function within an ecosystem. At this point Dr. Emerton discussed the importance of remembering that valuation is only a tool that is used to value something. Some of the other points that came out of this discussion included: Giving value does not ensure conservation. She provided a summing up of the workshop and the following questions that came up throughout the day:

Economics and Biodiversity

- What is the economics of biodiversity?
- How do the economics of biodiversity relate to Pakistan?
- What has been the experience to date?
- Where do we go from here?

Economics and BAP

- Little economic input
- Few economic measures
- Importance of economic resources
- Low capacity is a major problem
- Need information, policy change, incentives that are relevant to Pakistan
- Need to bring the Ministry of Finance and other ministries and departments on board
- Actually implementing BAP and the realities economic ground realities involved.

Valuation, Policies, and Incentives

- Where do we go from here?
- The identification of stakeholders – awareness, generation of studies, valuation exercises
- How to make participation a reality?
- Documentation and dissemination of information to a wider range of stakeholders.

Vote of Thanks: Kashif M. Sheikh gave a final vote of thanks to the participants for such healthy and participatory discussion on the subject.

14.6. Brief

Economics and Biodiversity Conservation: Awareness, Review and Exploration

IUCN-Pakistan has organized a workshop on Economics & Biodiversity Conservation: Awareness, Review and Exploration. The overall purpose of the workshop is to examine the economics and biodiversity linkages, which have and can play a very constructive role in the initiatives, enlisted in the Biodiversity Action Plan for Pakistan. This will be in lieu of the workshop's three components. First, an overview presentation on the Economics of Biodiversity; second, a presentation on the National Case Study on the Integration of Economics into Pakistan's Biodiversity Action Plan; and finally, by way of discussion groups, the identification of key valuations, policies and incentives which signal a way forward in the implementation of Biodiversity Action Plan (BAP).

The need for this workshop arose as a result of a recently concluded study entitled: *National Case Study on the Integration of Economics into Pakistan's Biodiversity Action Plan*. The study was carried out by SDPI under the overall supervision of the Biodiversity Unit of IUCN-Pakistan. Background to this study can be found below.

IUCN has begun to forge ties to integrate the economic aspects with biodiversity conservation in many different regions of the world. At a broader level, IUCN also wishes to seize this opportunity to follow-up activities as there is growing interest and enthusiasm in the Government, NGOs and Academic Institutions on environmental economics. This workshop, we believe, will aid in identifying specific interests and stimulate debate on this emerging field in Pakistan.

The approach, we believe, to eliciting this interest and stimulating debate can be best amassed through the formation of discussion groups at the workshop. Thus the final component of this workshop discusses valuation, incentives and policies accordingly. These are the three pillars of biodiversity economics, and will be used for identifying Pakistan's specific interests, priorities and needs. We, however, recognize that all three pillars are inextricably linked, and therefore, we will attempt to synthesis them in the plenary session. As food for thought, a short description of these concepts follows below.

Valuation

Valuation in the context of biodiversity means to come up with appropriate 'prices' where markets and government policies fail to determine them. This is because several characteristics of habitats where biodiversity reside, such as life support, waste disposal services and amenities, are difficult to handle by the market system as they are not traded in markets, and hence, have no or under-estimated prices. This can be caused both by market failures and missing markets. Policy failures occur when government by providing subsidies deliberately lowers the price of certain goods and services. This situation, in general, leads to the under-valuation and over-consumption of biodiversity. However, through both in-direct and direct valuation methods, a price can be deetermined. This allows us to compare in similar units, for example, the costs and benefits of biodiversity conservation with other interventions.

Incentives

Incentives can be thought of as a set of signals inducing individuals, private sector companies, governments and NGOs to alter their behavior. Incentives, for example, taxes, subsidies, property rights, etc. can be used to conserve biodiversity or to use it in a sustainable manner and more importantly derive benefits from doing so. However, If it turns out that actors have an incentive to destroy components of biodiversity - because of prices and valuation of biodiversity, the nature of individual and collective property rights, strength and effectiveness of institutions, expectations about the future and policies adopted by the government - we should not be surprised if this really happens.

Policies

Policies are formal statements adopted and pursued (the means) by the government to achieve a desired result (the ends). It is important to recognize that economic policies often encourage biodiversity loss, while biodiversity policies often ignore economic issues and instruments. There is a crucial need to integrate the two. Here the link between policies, incentives and valuation becomes clearer. If, for example, government incentives for deforestation and land clearance is leading to the depletion of biodiversity, valuation demonstrating the 'true' social costs and benefits of biodiversity depletion can be an important input in correcting market and policy failures, and hence, sending the right incentives to actors.

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