

# **Environmental Security in Pakistan — Are There Grounds for Optimism?**

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The environmental problems of the poor will affect the rich as well, in the not too distant future, transmitted through political instability and turmoil.

**-- Gro Harlem Brundtland**

The situation is epitomized by the leader who proclaims he will not permit one square meter of national territory to be ceded to a foreign invader, while allowing hundreds of square miles of topsoil to be eroded away each year.

**-- Unknown source**

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# Environmental Security in Pakistan — Are There Grounds for Optimism?

Shaheen Rafi Khan

## **Abstract**

*Conventionally defined, the term security refers to the defense of sovereign states against violent attack, either from states or from terrorist or revolutionary groups within their borders. As such, security has an impersonal and organized aspect. Defined in more generic terms, security connotes conditions that make people feel secure against want, deprivation and violence. Environmental security is a subset of human security. By numbers and by the magnitude of their activities, human beings are causing rapid bio-geochemical changes in the Earth system. The term 'activities' is synonymous with unsustainable development processes.*

*The absence of sustainable human development charts two paths to degradation: the direct route and the indirect route through social inequity and injustice. This increases the vulnerability of the poor to degradation. In turn, the poor are driven to prey upon the environment, a condition described as the poverty-environment nexus. Pakistan's performance by sustainable human development criteria has been found wanting. Its social and environmental indicators show a marked degree of inequity, injustice and advanced stages of environmental degradation.*

*Two case studies illustrate the insecurity-conflict nexus. An interesting paradox is presented, reflecting the interplay of social and economic forces. In the Dir-Forestry case these forces have established an almost surgical divide between the antagonists. Namely, communities are arrayed against a consortium of vested interests. Institutional redress mechanisms (official investigations, judicial recourse) lack transparency. Ultimately, they are subservient to powerful economic forces. There are very real risks that the combination of rapid deforestation and continued exploitation of the communities will escalate into large-scale violence. In contrast, the Kalabagh Dam study presents a different dialectic. While economic and environmental interests separate the antagonists, the lines of conflict are blurred by their social construction. Powerful lobbies exist on both sides of the divide, both with an interest in increasing water allocations. The government, as is its wont traditionally, defers to these lobbies, resulting in an uneasy compromise. But it is a compromise driven by power rather than environmental or social logic, which underscores its fragility.*

Environmental security is a still evolving notion that covers a vast area with diffuse causes and heterogeneous impacts. In order to study environmental security—or rather insecurity—in the context of Pakistan, this paper will first briefly review the competing perspectives on environmental security. The next two sections will root the discussion in Pakistan's development experience—first outlining the paths to environmental degradation and then assign the impacts of such degradation on the human security of the poor in

Pakistan. This will be done in the context of sustainable human development criteria, focusing in particular on the resulting environmental impacts, the growing vulnerability of the poor, their responses, the induced insecurity and conflict potential. A simple environment-security model, which is the formal setting for this paper will also be presented. Finally, 2 case studies will be presented to highlight the application of the concepts developed in the chapter with a focus on the institutional prerequisites for transparent and effective governance.

## **Perspectives on Environmental Security**

### ***The Conventional View***

Conventionally defined, the term security usually refers to the defense of sovereign states against violent attack, either from other states or from terrorist or revolutionary groups within their borders. It evokes an image of soldiers, missiles, tanks, guns, bombs, with states, either individually or in alliance—as equals, or in a patron-client relationship—geared perpetually for military confrontation. Clearly, this impersonal and organized aspect of security leaves little space for the legitimate concerns of ordinary people, who seek security in their ordinary lives.

The tendency to fold emerging environmental concerns into this narrow military context is, seemingly, not misplaced. Competition for land and natural resources (e.g., oil, minerals, etc.) has long been a source of hostilities between countries. Such resources are seen in strictly strategic terms—as enhancing a state’s ability to protect itself from aggressor competitors. Equally, oil, coal and fuel factories are vital for tanks and naval ships, contributing to states’ capacities to wage war and achieve security from violence. But this is where the parallel ends. Non-renewable resources lend themselves more easily to conflictual mind-sets, whereas renewable resource-related problems tend to transcend state boundaries and require cooperative solutions. Furthermore, resource wars are becoming a diminishing possibility. Globalization and the ascendancy of global trade clearly prefers market, rather than military, solutions; small nations are protected by international law and are able increasingly to defend themselves against armed incursions and; finally, thanks to technology, cheap substitutes for virtually every raw material, except oil, are available.

The attempt to seek a convergence of perceptions should, perhaps, defer to the functional dissimilarities. Thus, war destroys the environment directly, as exemplified by the wartime nuclear detonations by the US in Japan, or its use of defoliants in Indochina. In fact, preparation for war, for instance nuclear tests and biological and chemical weapons research, is equally—if not more—destructive of the environment, consuming vast fiscal, organizational and leadership resources, which could better be spent on environmental restoration.

### ***Human Security***

Defined in more generic terms, security connotes conditions that make people feel secure against want, deprivation and violence. Most people desire protection, not only from external and internal violence but also from the threat of disease, hunger, unemployment,



crime, social conflict, political repression and environmental hazards. According to the United Nations definition, “ultimately, it is a question of human security—a child who did not die, a disease that did not spread, a job that was not cut, a dissident who was not silenced. Defined in this manner, security represents not only protection from violence and deprivation but the enhancement of life’s choices, of improvements in the quality of life.” (Human Development Report: 1994: 298).

There is a preventive, integrative and inter-generational aspect to human security, which contrasts sharply with its insular, aggressive and myopic counterpart. Human well-being is embodied in a development process that is efficient, equitable and sustainable. Its absence creates social excesses, economic problems and environmental hazards. These also have a tendency to spill over national borders, taking diverse forms—such as famine, disease, pollution, drug trafficking, terrorism, etc. Thus, sustainable human development is not only a *sine qua non* for the security of individual nations; it also has a cross-border aspect, where the rich nations have an obligation help the poorer nations. In doing so they also guarantee their own security.

### ***Environmental Security as a Subset of Human Security***

In the first place, the overall ecological concern is with anthropogenic—as opposed to purely naturally sourced, or biocentric—environmental changes. “The essence of this global change problematique is that human beings, by virtue of their numbers and the magnitude of their activities, are causing bio-geochemical changes in the Earth system that are taking place many times more rapidly than those ... occurring naturally” (Soroos: 1991: 317).

The term ‘activities’ can be viewed as a catch phrase for unsustainable development processes. Whether they take the form of excess consumption, as in the North, or inequitable and resource extractive development outcomes, as in the South, both contribute to environmental degradation and pollution. Also, both have global ramifications. In the first case, these are evident directly, for instance, in ozone layer depletion and global warming. In the second case, they manifest themselves through induced human behavior, such as mass migrations and the spread of contagious diseases across countries. An additional aspect of the latter is the vicious, downward spiral of poverty and environmental degradation. As Lester Brown, president of the Worldwatch Institute puts it, “Unless we redefine security, recognizing that the principal threats to our future come less from the relationship of nation to nation and more from the deteriorating relationships from ourselves and the natural systems and resources on which we depend, then the human prospect could be a bleak one. If we do not act quickly, there is a risk that environmental degradation and social disintegration could begin to feed on each other.” (Myers: 1993)

This condition also draws attention to the fact that the poor are the perpetrators only in their capacity as victims. Stated differently, degradation is rooted in unsustainable development. Poverty is both a direct and a related outcome—in the sense that communities are further impoverished and disempowered by the degradation such development engenders. It follows, then, that poverty-induced degradation can be seen as an ineluctable response, rather than as a deliberate or voluntary act (Khan and Naqvi: 2000).

### ***Responses to Environmental Insecurity***

Despite the fact that the rationale for attributing traditional security mind-sets to non-renewable resources is diminishing, there is a tendency still to invoke them, even in the case of renewable resources. For instance, protagonists argue that cross-border tensions over deforestation, pollution, water and marine fisheries can snowball into full-scale military conflicts. Careful scrutiny reveals that aggressive posturing notwithstanding, bilateral (such as the Indus Basin Treaty between India and Pakistan) and multilateral accords (such as those on marine fisheries) are more the norm. The prospect of water accords between Jordan and Israel, Iran and Iraq, India and Bangladesh, and Nepal and India appear likely at some point in the not too distant future. In cases where a stalemate occurs between two countries, multilateral arbitration kicks in more often than not.

However, agreements risk unfolding unless they are underpinned by appropriate domestic policies for efficient and sustainable resource use. In fact, the risk of military confrontations increases in direct proportion to the profligate use of renewable resources. “Ultimately, the key objective should be to conserve the resource in order to maintain adequate supplies well into the future, rather than trying to control more of a resource that is being depleted” (Porter: 1995: 221). Where the threat is transnational—ozone depletion, climate change, biodiversity loss, etc.—the logic of global cooperation is demonstrated even more vividly. The problem originates collectively and has global ramifications. Defined in these terms, it lies beyond the scope of established diplomacy and international relations; as Ullman (1983: 140) puts it succinctly, “We can not launch fighter planes to resist global warming.”

The advantages of responding to these problems through cooperation, rather than confrontation, are apparent. For one thing, it converts a zero, indeed, negative sum game into a win-win situation, where all countries can share the benefits of resource conservation and reduced pollution. Second, global responses represent the antithesis of stark Hobbesian choices where, for instance, citizens may have to opt between personal liberty and freedom from gratuitous or organized violence. In the wider context of human security, all aspects of liberty become equally important. A cooperative approach makes it possible to accommodate all these aspects, as opposed to forcing trade-offs between them.

An encouraging, post-Cold War, development is that successive US administrations have become aware, at least in their rhetoric, of the need to redefine national security to encompass environmental threats. Under the Bush administration, a 1991 presidential document defined US national security objectives to include, “assuring the sustainability and environmental security of the planet.” The Clinton administration integrated environmental security even further into its national policy agenda. President Clinton described a stark vision of a future world of overpopulated countries, depleted resources and extreme divisions of wealth and poverty, calling for a strategy of sustainable development as a comprehensive approach to the world’s future (Porter: 1995:). A logical corollary of this is that it is better to empower poor countries economically, politically and socially in the interests of preserving democratic value systems and world trade, rather than viewing them as client states whose loyalty can be bought by arming them to the teeth. . Unfortunately, the rhetoric risks coming unstuck, given the present administration’s belligerent attitude on issues ranging from climate change to nuclear strategy.

Defined in this manner, environmental security has certain organizational implications as well. Security as a human value is biased towards preserving the status quo, in the sense of minimizing human-induced changes to the environment that degrade and disrupt it with adverse

consequences for current and future generations. In other words, “it is a conservative value orientation in regard to maintaining earth systems” (Deudney: 1990). In contrast, environmental stewardship requires behavioral and organizational changes. Its professional ethos is ‘husbandmanship’—more respectful cultivation and protection of plants, animals and the land. It calls for partnerships between governments, NGOs and the private sector as well as between nations and between regions.

### ***Globalization and the North-South Debate***

The downside of a global approach is that it can transmute easily into pernicious arrangements that generate inequitable and environmentally harmful outcomes for developing countries. Thus trade and patent agreements have engendered unsustainable resource use, land degradation and biopiracy. The recent agitation in Seattle at the WTO Ministerial meeting is testimony to the fact that even Northern progressive elements found the WTO conditions unacceptable. Global environmental accords such as the Kyoto Protocol can have equally pernicious implications. In its present form, it could limit low-cost development options for third world countries. Although polluting, these options are deemed acceptable given the relatively low per capita emissions of these countries. Furthermore, developing countries are also encouraged to compete for funding for low-cost mitigation options through mechanisms such as the CDMs, thus limiting their choices at a point in time when their GHG emissions actually converge to the global average.

An economic interpretation offers hope for justice in the future. Ultimately, the choice is between what individual countries (or groups of countries) have to forego in the short term in return for what they would recoup in the future through collective action. At first glance, this may appear a simple economic trade-off; somewhat prosaically, the choice is a function of the discount rate applied to collective action. Illustratively, the proclaimed success of the Montreal Protocol on ozone depleting substances and the relative failure of the Kyoto Protocol on climate change reflect varying costs of abatement and mitigation. As the costs of not implementing these options rise (global warming, sea level rise), the rationale for collective action will increase. However, economic considerations, alone, cannot convert perverse incentives that promote degradation into a set of environmentally appropriate ones. These need to be supplemented with generous dollops of political will, awareness creation and advocacy.

### ***A Digression: Can the Military/Security Agencies be the Agents of Conservation?***

A recent study on environment and insecurity in the North West Frontier Province (NWFP) of Pakistan recommends that, “major military and security agencies ... have a reasonably defined role that may expand their responsibilities beyond those of traditional security concerns” (Hanson, 1999: 12). The preamble alludes to the risks in viewing environmental concerns through a traditional security prism. In South Asian countries the incompatibility becomes more pronounced -- for three reasons.

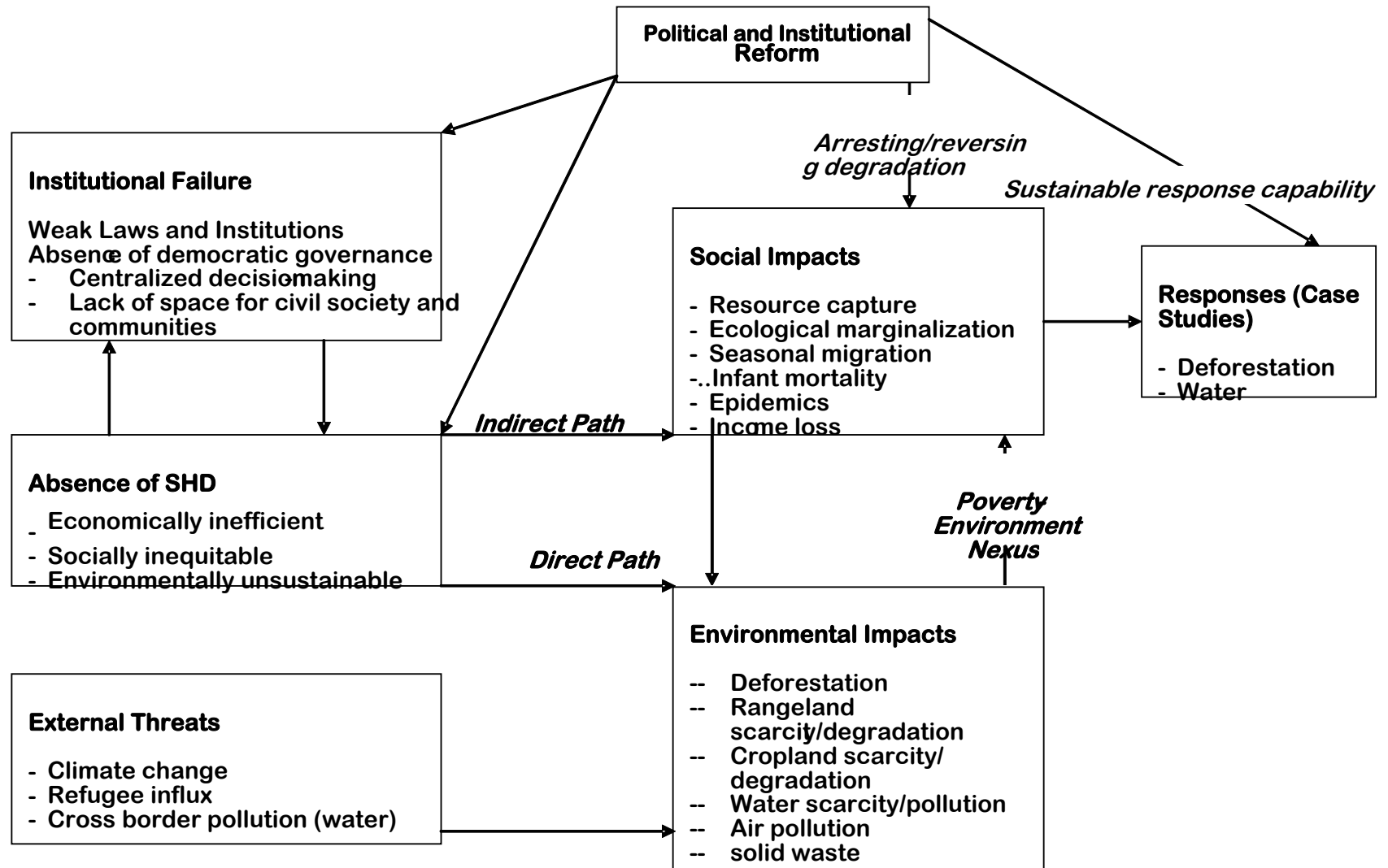
First, security forces impose the will of the state unquestioningly. Sensitizing them to environmental security concerns can prove a double-edged weapon. Experience has shown that a liberal dispensation at the concept stage tends to metamorphose into an arrangement for imposing the will of government agencies and vested interests upon local communities. A classic example of this is when security forces resort to punitive measures when communities encroach in forests to meet their subsistence needs but overlook major acts of degradation perpetrated by timber contractors and government development agencies. Second, budget appropriations for the military vie directly with allocations for social services and

environmental conservation. Essentially, the message is that fiscal reallocations, which address the problem at source, are far more effective than enforcement, which deals with the consequences of not doing so. Third, cross-border adventurism contributes directly to degradation as well as through population displacement. The country paper from India in this volume (by Asthana and Shukla) dwells on this at some length. On the whole, it would not be far from the truth to state that the military in developing countries tends to be more the problem than part of the solution. Any discussion of their involvement in an expanded security paradigm that includes environmental security concerns needs to begin with, at the least, a cautionary stance.

### ***A Simple Model***

In order to accommodate the above ideas into a conceptual basis for further analysis, a simple environment and security model for Pakistan is presented in Figure 1. It is adapted from the NWFP-specific model, developed by Hanson (Hanson, 1999: 41) and combines features of the Homer-Dixon model (Deudney and Matthew: 79: 1999) and the Gleditsch model (Gleditsch: 1998). Subsequent sections will highlight two situational and case analyses to illustrate the route to conflict. The basic message is while it takes time for insecurity to degenerate into conflict -- environmental resilience and social tolerance tend to be high and can withstand considerable stress -- the long-term risks of conflict are very real in the absence of political and institutional reform.

Figure 1





Simply put, the pathways to degradation and conflict are as follows. The absence of sustainable human development leads to environmental degradation and to social inequity and injustice. The latter condition increases the vulnerability of the poor to degradation. In turn, the poor are driven to prey upon the environment. This process sets into motion a vicious downward spiral referred to as the poverty-environment nexus. External influences can also be environmentally destabilizing. The case studies show how inadequate remediation mechanisms can result in conflict. It is almost tautological that political and institutional reform is a sine qua non for more environmentally and socially benign development, for arresting degradation directly and for putting in place mechanisms to prevent and mediate conflict.

## Pakistan: Paths to Environmental Degradation

The previous section has defined environmental security as one of the many inter-related strands that contribute to human security. These include, in addition, economic security, food security, health security, personal, community and political security. The fulfillment of these conditions assures, at a minimum, a level of personal, social and political well-being, which allows people to both exercise and improve their life choices. Sustainable human development or SHD is both a necessary and a sufficient condition for this—in as much as it establishes the conditions for human security, as well as the means for sustaining and enhancing it.

Briefly, SHD is an embracing concept, which defines and integrates development, equity and sustainability in relation to the three central pillars of sustainable development – economic, social and environmental (see Munasinghe, 1998; Khan, 1998). Table 1 illustrates the various ways in which Pakistan has fallen short of meeting minimum SHD criteria. The remainder of this section will focus on those aspects of the development process, which have engendered particularly adverse environmental impacts. The next major section will investigate the impacts of such degradation on the poor.

Table 1: The Absence of Sustainable Human Development (SHD)

<b>Common Elements</b>	<b>The Three Pillars of Sustainable Development</b>		
	<b><i>Economic</i></b>	<b><i>Social</i></b>	<b><i>Environmental</i></b>
<i>Development/Efficiency</i>	<p>Macroeconomic instability (fiscal deficits, current account imbalance, exchange rate overvaluation)</p> <p>Sector price distortions (industrial protection via tariffs and licenses, input and output price</p>	<p>Low social sector allocations (education, health, water supply and sanitation, income generation and employment)</p> <p>Poor outreach of poverty reduction schemes, politically influenced</p>	<p>Policy neglect and low allocations for natural resource conservation and the use of environment-friendly technologies</p> <p>Failure to internalize environmental effects (perverse incentives</p>

	subsidies, varying degrees of state intervention in industrial production, utilities service delivery, internal and external trade)	entitlements and misappropriation of funds	encouraging extraction rather than conservation, unable to enforce/comply with environmental quality standards governing emissions and pollution)
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*Continued.....*

	The Three Pillars of Sustainable Development		
Common Elements	<i>Economic</i>	<i>Social</i>	<i>Environmental</i>
<i>Equity</i>	Tax policies favoring the affluent (regressive indirect taxes, agriculture income tax exemptions)	Minimum provision for grassroots participation and empowerment of disadvantaged groups in the formulation and implementation of policies and development programs  Centralized decision-making and governance provides little space for social capital to develop or articulate itself	Degradation and pollution impact disadvantaged groups adversely (ecological marginalization, urban industrial and vehicular pollution, household fuel consumption, sanitation and waste disposal)
<i>Sustainability</i>	Degradation of physical infrastructure (industrial, municipal, transport and utilities)	Lack of resilience in political systems (military coups frequently replacing elected governments)  Withering of informal legal and social systems thanks to modernization ('panchayats', 'jirgas', traditional support networks and resource management practices)	Degradation – irreversible in many cases -- and increased vulnerability (deforestation, rangeland degradation, biodiversity loss, coastal zone erosion, air, soil and water quality deterioration)



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### ***The Institutional Vacuum—A Direct Route***

The existing state of degradation and pollution is a result of the failure to mainstream environmental activities within the development process (Jalal: 1993: 9).<sup>1</sup> At some risk of generalization, one might define this process as highly resource, capital and technology intensive. Relatively little weight is given to economic and financial incentives as a means of conserving land, forest, air and water resources, or using them in a sustainable manner. A more critical problem lies in how such development is managed. The prevailing trend in Pakistan has been for a nexus of landed, industrial, military and techno-bureaucratic elements to give its own shape and form to the prevailing development paradigm, and to capture most of its benefits. 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.

When such development takes place in the absence of democratic and decentralized governance, environmental problems are compounded. Centralized state institutions tend, at best, to be insensitive to the importance of community property rights and empowerment and, in general, to the need for public space to facilitate the growth of social capital. At worst, they are hostile to decentralized initiatives, viewing them as a threat to their sovereignty. This is unfortunate as, backed by the right incentives, traditional community practices offer considerable hope for sustainable environmental management (Jodha: 1998) Similarly, an aware and motivated civil society can play an active role in environmental conservation.

Lapses from sustainable human development, leading to the secular deterioration in Pakistan's environmental health, are evident from several key indicators. Roughly 38 percent of Pakistan's irrigated land is waterlogged and 14 percent saline. The annual rate of deforestation ranges from 2.5-3 percent. Carbon dioxide emissions are increasing annually at the rate of 8-10 percent. And an estimated 250 million gallons of untreated water out of Karachi 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. Recent data indicates that over one million acres of fertile, arable land in the Indus delta has become saline and unusable. The retention of freshwater flows by large dams has allowed salt-water incursion on a large scale, a problem likely to be exacerbated by sea-level rise induced by global warming. (Khan: 1999)

Two attempts to quantify environmental losses raise serious concerns about the sustainability of economic growth. Using extremely conservative assumptions, World Bank economists Brandon and Hammond (1995) estimate that environmental degradation results in the loss of about 4 percent of GDP every year, thus offsetting considerably the conventionally measured GDP gains. The breakdown of the GDP loss includes annual health impacts of water pollution (US\$759 million) and air pollution (US\$301 million), and the loss of agricultural production due to land degradation (US\$300 million). Another way of interpreting the same data is in terms of the net savings rate of the country—after accounting not only for the depreciation of physical capital, but also the degradation and depreciation of “natural capital”, accounting for energy and mineral

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1 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.

resource depletion, net deforestation and emission impacts. A low savings rate means the lack of adequate resources for investment and growth. The World Bank (1997) estimates the ‘genuine savings rate’ for Pakistan in 1997 to be only 2.5% of GDP.

### ***The Poverty-Environment Nexus—The Indirect Route***

While Pakistan has achieved impressive aggregate economic growth—with GDP averaging in excess of 5 percent over the past three decades and a steady increase in per capita income (currently assessed at US\$480 in real terms and at approximately US\$2,000 in purchasing power parity terms)—its impact in terms of poverty reduction is more ambiguous.<sup>2</sup> The proportion of the population below the poverty line fell from 46 percent in 1984-85 to 34 percent in 1990-91 (World Bank, 1995), but has stagnated around this level in recent years. Less clear is whether the improvement in consumption poverty was accompanied by a reduction in the absolute number of people falling below the poverty line. Pakistan did not perform well by another measure of poverty, namely, income inequality—as represented by the income share ratio and the Gini coefficient. Both have worsened over time. Finally, Pakistan’s performance is even less creditable with regard to human development. Its social indicators are far below those of low-income countries, with comparable or lower levels of per capita income. Furthermore, disparities across provinces as well as across the rural-urban divide are pronounced (Khan, 1999).

A cyclical, downward spiral defines the relationship between poverty and environmental degradation. In the first place, poverty increases the vulnerability of the poor to degradation. Second, by restricting choices and entitlements for the poor, it turns them into potential predators of natural resources. However, the converse of this is that limited choices also create an impetus for nurturing resources and using them in a sustainable manner. A credible construct that contextualizes the poverty-degradation relationship is probably a blend of the two. In other words, poverty does not necessarily induce degradation but if it does this reflects inevitable responses rather than deliberate acts.

### ***Impacts of Degradation on the Poor Resource Capture and Ecological Marginalization***

Amongst the different impacts of environmental degradation, two deserve particular mention here; resource capture and ecological marginalization.

Development that empowers the few, population growth, and the growing scarcity of natural resources combine to create a situation known as ‘resource capture.’

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2 Poverty is a multidimensional term. Consumption poverty refers to the extent to which the private consumption of individuals or households falls below the ‘poverty line’, the minimum acceptable standard of private consumption. Another important dimension focussing on human development, a term which captures improvements in education, health, water and sanitation and the provision of sustainable livelihoods.

*Resource capture occurs when population growth combines with a decline in the quantity and quality of renewable resources and the spread of market incentives to encourage powerful groups to alter the distribution of resources in their favor. Resources are, in effect, appropriated by elites, increasing environmental scarcity among poorer or weaker groups as a result. The manner in which this is done is through conversion of land from customary tenure to formal land titling. Groups experiencing this scarcity are then often ecologically marginalized as they migrate to rural or urban areas that are ecologically fragile. The resulting high population densities in the receiving areas, along with the migrants' lack of capital and knowledge of how to protect local resources, act to generate further environmental damage and chronic poverty. As scarcities of resources such as forests and urban land worsen their prices increase which leads to more acquisitive behavior, in effect creating a self-perpetuating cycle. (Gizewski and Homer-Dixon: 1996: 9-10).*

One of the key consequences of resource capture is ecological marginalization, where such appropriation forces resident communities to migrate to marginal areas. Population growth compounds the problem. It is an outcome of social sector neglect and a factor that, subsequently, makes inroads into the benefits of growth. Ecological marginalization exhibits itself in a number of ways.

One aspect is accelerated intra-rural migration. In the NWFP in Pakistan, for example, land starved rural populations have moved into marginal lands, into erosion prone hill areas and into fragile semi-arid areas that have traditionally served pastoral groups and their herds. This has resulted in conflicts over land access. Consequently, low-quality pasture is now used more intensively and pastoralist herds, forced to graze post-harvest crop residues, are not fertilizing agricultural land as much as before. As resources come under pressure from increasing numbers of land-poor and landless rural people, traditional management, tenure and rights systems face collapse. Thus, grazer rights are being encroached upon, tree rights are subsumed under land rights, leading to deforestation and land clearing and state lands are under constant threat from farmers, loggers and fuelwood collectors. The refugee influx, from war-torn Afghanistan next door, has only aggravated the problem further.

A different and more complex situation prevails in the Northern Areas of the country. In these areas, the resource management problem is a function of cognitive space, property regimes and scarcity (EDC: 1992: 30). Exposure to market forces, thanks to the Karakorum Highway (KKH), has expanded the economic horizons of the remote mountain valley dwellers, provided an outlet for an expanding population, commensurately reducing pressure on the environment. A consequence of this is that “degradation of their surroundings is less of a concern to the villagers because its importance is not as dominant as it used to be” (EDC, 1992: 33). Also, migration to the small towns that have sprung up along the KKH has given rise to new problems of urban pollution. On the other hand, in the more inaccessible valleys, the people remain more sensitive to the degradation problem and traditions of communal participatory management remain strong. By the same token, there is greater receptiveness to community-based, participatory interventions, which build upon such practices.

## **Sector Impacts and Vulnerability**

This section analyzes the vulnerability of marginalized populations to environmental degradation at the sector level. The effects on the poor are specially destabilizing because of their limited choices. Consequently the potential for social instability and conflict is high.

### ***Water Pollution***

Water pollution has three main sources: bacterial and organic liquids and solids from urban and rural domestic sewage; toxic metals, organic pollutants acids and other toxic substances from industrial discharges; and chemical pollution in the form of pesticide and fertilizer run-off from agricultural lands (Bakhtiar, 1992). Although the pollution caused by organic and chemical discharges is widespread, its impacts are predominantly on the poor as a result of the skewed distribution of sewage, sanitation and piped water facilities, both across the rural-urban divide and in poor urban slums.

In the older parts of cities, which are prone to in-migration, sewage infrastructure is both poorly designed and maintained, which results in the frequent mixing of raw sewerage and drinking water. Thus, even piped drinking water in poor urban localities is highly contaminated. Where it is not available, residents are compelled to use groundwater accessed through dug wells and shallow hand pumps. Such water also contains bacterial and chemical impurities, as does the water flowing through streams and rivers, which is used for drinking and washing. Poor sanitation and sewerage is, typically, synonymous with the absence of proper waste disposal. Dumped close to the sources of water, disease-causing pathogenic substances seep into the ground from where they find their way into the water supply. Also, the poor are often forced to settle in the low-lying urban areas, which although relatively more affordable are more prone to flooding, water pollution and disease.

In rural areas, the poor depend on rainwater that accumulates in ponds, in rivers and springs, as well as on ground water extracted through dug wells and hand pumps. The absence of modern sanitation and prevalent evacuation practices results in biological contamination of the water supply. In peri-urban areas, where rural migrants tend to concentrate, on-site run-off from proximate industrial and residential areas also contributes to water pollution.

The problem is compounded by the fact that there is a chronic lack of health facilities to deal with the effects of water pollution. Absence of adequate nutrition and lack of education and overcrowded housing increase vulnerability to disease. A telling statistic is that infant mortality continues to remain high even though most demographic indicators have improved, a result of infants' high rate of exposure to waterborne diseases. The better off are better able to fend for themselves, given their access to household alternatives such as periodic cleaning and lining of underground water tanks, water filters and mineral water. The poor, however, are left to bear the brunt of the health costs of water pollution.

### ***Air Pollution***

Air pollution ranks as high as water pollution in terms of its health effects and its incidence on the poor. Past and projected trends in air pollution are linked closely with the country's energy profile, as well as its use efficiency. Two factors are of concern from a poverty perspective. First, the reliance on biomass continues to be high—close to 40% of total energy consumption (Khan: 1997). While used predominantly in the rural areas, it is also an important fuel source in urban slums. Second, among modern fuels, oil is rapidly replacing natural gas as a fuel source for energy generation and industrial consumption. Moreover, as gas supplies dwindle, substitution with indigenous coal is becoming increasingly feasible.

The use of both coal and oil based fuels in the industry, energy and transport sectors has adverse health implications for the poor, especially within and in the proximity of urban areas. In particular, the use of subsidized diesel in old public transport results in extremely high and toxic emissions.

Traditionally non-biomass based air pollution was considered to be an urban phenomenon. More recently, the location of industrial sites, the growth of brick kilns and the penetration of transport into rural areas has made air pollution a rural problem as well, particularly in the peri-urban areas and along the major national highways. For instance, it would be difficult to find an uninhabited stretch of more than five miles along the Grand Trunk road between Lahore and Islamabad.

Low-income neighborhoods mushroom around industrial areas and power plants, where exposure to air pollution is high. The poor also work long hours in factories in unsafe conditions—women and children are particularly vulnerable—exposed to dust and chemical inhalations in sweatshops and household industries producing textile items, carpets and leather goods. Traffic congestion and the resulting vehicular emissions are becoming an increasingly serious problem in the big cities. Poor communities are the most exposed to auto-emission and other toxic fumes, as they tend to live close to the main trunk roads.

From the perspective of health impacts, the incidence of respiratory diseases and lead poisoning (predominantly among children) from mobile and stationary source emissions is escalating rapidly. As in the case of water pollution, factors that increase the vulnerability of the poor are poor nutritional intake, crowded living conditions (which increases the risk exposure) and lack of access to medical facilities. Trapped in a vicious cycle, those who are the most disadvantaged are ultimately made more so.

Chronic respiratory infections are caused by exposure to biomass emissions from cooking and heating in confined spaces in rural homes and in urban slum households. Women suffer much higher health risks as they do the cooking exclusively; children and infants are equally exposed as they stay close to their mothers. In the rural areas, poor uneducated farmers are exposed to the detrimental effects of chemical agricultural inputs. Excess use, drifting sprays, leaky applicators and the lack of knowledge of handling dangerous substances enhances health risks. Similarly, women engage extensively in cotton picking, the cash crop consuming more than 90% of the total fungicides and pesticides in use. According to a 1991 sample survey of 88 cotton pickers (mostly women), only 1 percent was safe from the hazardous effects of pesticides. Seventy-four percent had blood acetylcholine esterase (AChE) inhibition between 50 percent and 25 percent were in dangerous condition where blood AChE inhibition was between 50-87.5 percent. (SDPI: 1995)

### ***Solid Waste Management***

Developing countries, in particular, are ill prepared to deal with the problem of solid waste, whether it involves dumping by foreign companies or is sourced internally in rapid urbanization and industrialization. Once again, the burden of the problem falls disproportionately on the poor, a consequence of distorted municipal budget and planning priorities.

In most cities in the South, between a third and a half of the solid wastes produced within urban centers remain uncollected, often accumulating on road sites and streets. In Pakistan, an average 50,000 metric tons of waste is generated every day. Municipalities collect only 60 percent of this

waste. Also, of the 8,000 tons or so of excrement produced daily, about half is deposited by the roadside or incorporated into solid waste. Whatever is collected is dumped in the open or, more frequently, burnt. Commercial, industrial and hospital wastes contain a high proportion of ‘hazardous’ or ‘toxic’ substances. These are often disposed untreated as normal liquid or solid waste into drains, water bodies or in open dumps without any special precautions. In general, there is a lack of provision of space for waste collection bins and dumping sites, municipal authorities lack human resources and vehicles for waste collection and disposal and make little or no efforts to instill a civic sense in the neighborhoods they serve.

Further, not only are waste disposal systems inadequate, they rarely serve low-income settlements. In fact, the solid waste collected in upper or middle class areas of cities is often dumped in the slums and city peripheries, either in landfills or thrown directly into watercourses. The poor areas of the city are generally the worst served by garbage collection services, or not served at all. The resulting problems are smell; disease vectors and pests attracted by garbage and overflowing and clogged drainage channels. The ill-planned agglomeration of squatter settlements makes waste collection a difficult problem, even when amenities are made available. Often, the dense housing and narrow winding streets do not allow vehicles to pass through, and with operation and management costs being unaffordable (since the government sets inflexible standards) structures tend to deteriorate rapidly.

Not surprisingly, this has myriad health implications. The untreated waste is loosely covered with soil and tends to absorb moisture, contaminating the underground water, which the poor use for drinking, cooking and washing. The resulting health impacts have been noted in the earlier section on water pollution. Municipal waste also contains left over food, which attracts animals and insects. These are another source of communicable disease, affecting scavengers who pick recyclable and reusable waste from dumping sites. As these people live in congested (usually one-room) houses, the diseases are easily passed on to other members of the family. Medical waste and toxic waste of factories, which is not treated separately during collection and disposal, turns into another disease medium. Residual waste which scavengers are unable to sell (torn plastic bags, pieces of tires and pieces of cloth) is used as fuel producing harmful emissions. Burning, a common method of getting rid of accumulated waste also produces toxic gaseous emissions, which affect poor people living in close proximity.

### **Deforestation**

Historical pressure on natural resources and ambiguously defined property rights, overlain with rigid and increasingly corrupt management, has contributed to rapid deforestation. Even if we defer to the official version that forest stocks are increasing, it is a doubtful achievement. In the first place, the increase is on an extremely low base—between 4-5 percent of Pakistan’s land mass is presently under forest cover. Further, the increase conceals diverging trends in forest types. In other words, primary forest cover is declining, with associated losses in genetic diversity and resilience. Independent estimates, however, show woody biomass disappearing at a rate between 4-6 percent per annum, which is feared to be the second highest in the world (BAP, 1998: 11). It is estimated that if the present trend continues, Pakistan's total woody biomass could be consumed totally within the next 10-15 years (BAP, 1998: 11). Indeed, Pakistan is one of the developing countries with no remaining biologically undisturbed forests (WRI, 1997). A less controversial finding is that both the quality and composition of forest stands is deteriorating. A recent study shows that good quality, tall tree forests (with more than 50 percent cover) occupy less than 400,000 hectares, (BAP: 1998: 11). Data

collected through satellite imagery presents an even a gloomier picture; it shows that only 308,000 hectares are under dense forest cover (FSMP: 1992).

The root cause of degradation lies in forest management practices, which have focused more on economic than on environmental utility. Such practices are also to the detriment of community subsistence needs. Colonial governments had originally weakened community rights to the use of forest resources. Usufruct rights continued to remain but were heavily proscribed. Community management traditions, already fragile, have eroded further with new opportunities for employment and out-migration. Also, 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 contains the seeds of conflict, with communities forced to act as predators, rather than as guardians of the commons.

Weak property rights and increased fears of expropriation by powerful groups fuel insecurity about future earning streams, especially in an inflationary environment and, in general, give rise to concerns 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).

While there is little doubt that under the presently hostile management and tenure regimes, communities are showing a propensity to raid forest resources, their activities pale in comparison with the activities of the so-called ‘timber mafia’; commercial loggers willing to undertake illegal logging driven by rising timber prices. The timber trade also demonstrates a distinct anti-community bias; while communities are entitled to a substantial share of revenues (royalties) from the logging in *guzara* forests, active collusion between the ‘mafia’ and the forest department results in appropriation of the bulk of these royalties.

### ***Agricultural Land Degradation***

The Green Revolution strategy of agricultural development was premised upon a sufficiency of both land and water. Major irrigation schemes (fed by large dams built at Mangla and Tarbela) were launched to harness this water and to apply it at the extensive margin. The intensive application of water and chemical inputs to high yielding dwarf varieties enhanced crop yields in wheat, rice, cotton and maize to a remarkable degree. However, questions have been raised regarding the longer-term viability of such a strategy. The evidence shows that the country’s agriculture resource base, comprising both land and water, has been mined unsustainably. The drainage system has not been able to cope with the irrigation practices, creating serious problems of waterlogging and salinity.

Policies and public sector management systems have given little space to incentives as a means of conserving such resources or using them efficiently. The economic aspects of the strategy, focusing on output price supports (which has kept prices of crops such as cotton and wheat below border prices) and compensating input subsidies have contributed to environmental degradation in a number of ways. The price support system has created relative price differentials, depressing prices of wheat and cotton, while increasing the price of sugarcane above world price levels, leading to over-production of this highly water dependant crop.

Environmental impacts stemming from input subsidies are even more pronounced and wide-ranging. Input subsidies include those on irrigation water, electricity, pesticides, fertilizer, seed, and machinery. Excessive use of fertilizers and pesticides has given rise to water pollution and soil degradation. A good review of these effects is in Banuri (1998) and Khan (1999). A combination of low water charges and inadequate operation and management has contributed to severe waterlogging and salinity problems.

Adverse terms of trade for food and cash crops have led to inter-sectoral transfers of income and to the further impoverishment of the poor rural population. Small and landless farmers are the worst affected, with their indigence leading to increased pressure on natural resources. Cropland degradation affects the health and nutrition status of the poor and lowers their productivity. This can happen directly through lower yields per unit of labor or land because of reduced soil quality and, indirectly, through the reduced physical capacity of labor because of malnutrition and poor health. Even in cases where the poor are healthy, labor productivity can be low, due to increased time being allocated to less productive activities, such as fuelwood collection. As a result of deforestation, family members have to go further to collect fuel, which takes time away from more productive cropping activities. Also, as fuelwood becomes scarcer, animal dung is substituted as fuel, resulting in non-replenishment of soil nutrition and, eventually, soil exhaustion.

## **Case Studies**

The previous sections have established the link between environment and security as a complex and multifaceted relationship, defined environmental security as a component of larger human security concerns, highlighted the multiple cause and effect relationships between and amongst different sectors and argued that in studying the subject a focus should be on the impacts on the poor and marginalized since they are disproportionately impacted and as least able to cope with the new layers of vulnerabilities added via the environmental security dimension. To further elaborate on these points, this section will present two case studies. These studies are selected on the basis of two criteria:

- They illustrate how each particular episode tends to contain its own route to conflict.
- They focus on equity at a national and local level.

The first is a case study of a national water policy issue in Pakistan—the Kalabagh Dam. The second case study focuses on a local forestry related episode, where outright conflict has erupted.

### ***The Kalabagh Dam Controversy***

The Indus River, the agricultural lifeline of Pakistan, flows in a southwesterly direction for about 2,500 km and empties through an immense delta into the Arabian Sea. The river system and its tributaries have provided Pakistan with some of the most fertile and best-irrigated land in the subcontinent, measuring about 200,000 square miles. Two large dams across the Indus River (Tarbela and Mangla) and a vast supporting irrigation network have both fragmented and altered its original ecosystems. A growing concern is that yet another dam across the Indus would prove environmentally disastrous; that it could trigger irreversible degradation of an already fragile ecosystem.



The expectation is that Kalabagh Dam would store an additional 6 MAF of water. Also, it would produce over 1200 MW of hydel power. However, the global and regional context for assessing large dams like Kalabagh is changing, with conventionally described irrigation, flood control and energy benefits being viewed through the prism of sustainable development and this provides the contextual back-drop for a review of the proclaimed benefits.

### **Water Availability**

In the first place, the water availability claims to justify a major dam at Kalabagh appear doubtful. WAPDA has used a wet cycle period to show higher inflows at the rim stations (146 million acre feet, or MAF). The longer period, which includes both wet and dry cycles, indicates relatively lower inflows (139 MAF). In addition, in order to show excess available for utilization, spurious inflows have been shown on the eastern rivers, above rim station amounts are inflated to add to downstream flows, water losses are understated and diversions to India under the Indus Basin Accord are not factored in. If Kalabagh were to be built on these false premises, the associated irrigation infrastructure would mean that the upstream province of Punjab would divert even more flows from the already water-starved downstream province of Sindh.

### **Water logging and Salinity**

As we have already discussed, water logging and salinity are amongst the severe environmental problems facing Pakistan, with almost incalculable economic ramifications. Building the Kalabagh Dam would mean even higher water retention in a system ill designed to cope even with existing inflows. In fact, the water logging and salinity problem is so acute that a controversial and exorbitant (US\$780 million), 25-year National Drainage Plan project has been launched to mitigate its impacts. Kalabagh is bound to add to the problem, not only in its immediate environs but also where new irrigation infrastructure would be situated.

Table 2: Land, in million hectares, with water-table depth of under 5 feet (By Province)

	Punjab	Sindh	NWFP	Balochistan	Pakistan
1988: June-October	0.54	0.86	0.06	0.04	1.50
	1.72	3.44	0.06	0.09	5.31
1990: June-October	0.71	2.34	0.05	0.09	3.20
1992: June-October	0.64	2.23	0.05	0.14	3.05
	1.25	4.08	0.06	0.14	5.53
1993: June-October	0.58	1.30	0.04	0.07	1.99
	0.98	4.60	0.06	0.15	5.25

Source: Compendium of Environmental Statistics of Pakistan, 1994-95

Furthermore, as Table 2 points out, the province of Sindh is already worst hit by water logging. The incremental land degradation, thanks to Kalabagh, is likely to be most pronounced there. The numbers for salinity, presented in Table 3, also indicate that its incidence is higher in Sindh than in the Punjab. Clearly, Kalabagh would add yet another wrinkle to an already politically fragile relationship between these two provinces.

Table 3: Land, in thousand hectares, affected by salinity (By Province)

	NWFP	Punjab	Sindh	Total Indus Basin
Total Canal Command Area (CCA)	320	7,891	5,351	13,562
Affected Area within CCA Percent	14 4.3%	1,614 20.4%	1,532 28.6%	3,160 23.3%
Affected Area outside CCA	502	1,129	1,019	2,650
Total Affected Area	516	2,743	2,551	5,810

Source: Soil Survey of Pakistan, 1977-78

Although the information in Tables 2 and 3 is quite dated and recent data is not available, the numbers are nonetheless important and relevant today. For example, Table 3 shows that even twenty years ago almost 30 percent of the area within the canal commands in Sindh was afflicted by salinity, as compared to 20% for the Punjab. There is general consensus that the situation has only become worse over the last two decades, arguably more so for Sindh.

The upshot is that attempts to increase crop production by tapping new sources of water could be self-defeating, thanks to the soil degradation, which results from it. There is an institutional dimension to this as well. Large farmers are liable to appropriate the bulk of the additional water under the existing supply-based distribution (*warabandi*) system. A clearly preferred choice is to use existing water more efficiently, and to focus on making the necessary institutional changes for its equitable distribution. Some of the proposed measures are selective canal and watercourse rehabilitation (in saline groundwater zones), commercial water distribution, pricing of water to reflect adverse environmental externalities and decentralized and participatory water management. These are clearly win-win solutions as they are relatively low cost, efficient, equitable and environmentally friendly.

As a rule, however, vested interests tend to prevail when there are expectations of reaping construction or irrigation benefits. And such benefits are garnered within the framework of loose and inequitable governance, at considerable cost to the national economy, the people and the environment. Thus, policy and institutional flexibility becomes imperative under the current circumstances.

### ***Ecosystem Degradation***

Degradation of the Indus delta ecosystem, as a result of reduced water outflows, is already a highly visible phenomenon. The present level of silt discharge, estimated at 100 million tons per year, is a four-fold reduction from the original level before the rivers were dammed. The combination of salt-water intrusion (some reports show this as 30 kilometer inland), and reduced silt and nutrient flows has changed the geomorphology of the delta considerably. The area of active growth of the delta has reduced from an original estimate of 2600 square kilometers (growing at 34 meters per year) to about 260 square kilometers. Freshwater reaches only a few of the creeks and others have become blocked. The delta is being transformed by strong wave erosion, an increasing dominance of sand at the delta front and an increase in wind-blown sand deposits as a result of losses in vegetation.

The consequent ravages to the ecosystem have been exceptionally severe, in particular to the mangroves, which are its mainstay. They sustain its fisheries, act as natural barriers against sea and storm surges, keep bank erosion in check and are a source of fuelwood, timber, fodder and forest

products, a refuge for wildlife and a potential source of tourism. Without mangroves and the nutrients they recycle and the protection they provide, other components of the ecosystem would not survive. The direct and indirect benefits of mangroves are enormous. In 1988, Pakistan earned Rs. 2.24 billion from fish exports (then around US\$ 100 MILLION), of which shrimps and prawns constituted 72 percent. The collective imputed income from fuelwood, fodder and forest products was another Rs. 100 million (around US\$ 4 million). These are broad orders of magnitude, which are threatened by mangrove degradation. Even where numbers are absent, the functions are, in themselves, indicative. For instance, substituting natural with physical barriers (dykes, walls, dredgers) would entail enormously high capital and maintenance costs. In addition, the wildlife and tourism potential of the mangrove swamps has not been exploited yet and is an additional source of potential income.

The condition of the mangroves is linked directly to fresh water outflows. Releases below Kotri barrage (in Sindh) average 34 MAF. Of this, about 20 MAF actually reaches the mangroves, and that, too, between the rain-fed (*kharij*) months of July and September. The rest is lost due to evaporation or diversions. According to the Sindh Forestry Department, about 27 MAF is required to maintain the existing 260,000 hectares of mangroves in reasonably healthy condition. This is 7 MAF more than currently available, a situation that has contributed to significant ecosystem instability and mangrove loss. Within the framework of the Indus Water Accord, the intent is to divert an additional 11 MAF for upstream dam construction, including Kalabagh, to meet agricultural and hydropower needs. This would result in a further reduction in existing sub-optimal flows and aggravate an already dire situation.

A community of about 100,000 people resides in coastal villages in the northern side of the Indus Delta. The mangroves are a vital source of livelihood for them; both direct (fuel, fodder, grazing) and indirect (fish, amenity values). The prevailing view is that being poor, such communities are prone to degrade their environment. However, it is difficult to fathom why poor communities should endanger the very basis of their existence. The more likely explanation is that community practices have not changed, but they appear unsustainable because the resource base has begun to degrade. Communities are more often the victims than the agents of such degradation. The real culprits are water diversion; biological and chemical water contamination and large-scale commercial practices, compounded both by institutional ignorance and complicity in such practices.

Degradation of the Indus Delta ecosystem is not the only manifestation of the 'biodiversity deficits' that are emerging along the entire length of the Indus river ecosystem. The ecosystem has been severely fragmented over time by its extensive network of canals, dams and barrages, resulting in threats to a variety of species and organisms. (See figure below) For instance, two species facing extinction in the lower reaches of the Indus River are the Indus dolphin and the 'palla' fish. Both can be classified as indicator species, as their impending loss represents the loss of a way of life, characterized by interdependence between communities and their environment. To all intents and purposes most stretches of the river Indus have been nationalized. This has led to the denial of fishing rights of riverine communities and the wanton exploitation of river resources through contractual arrangements. The emergence of new eco-equations and habitats or of planned captive breeding programs are poor substitutes for genetic resilience.

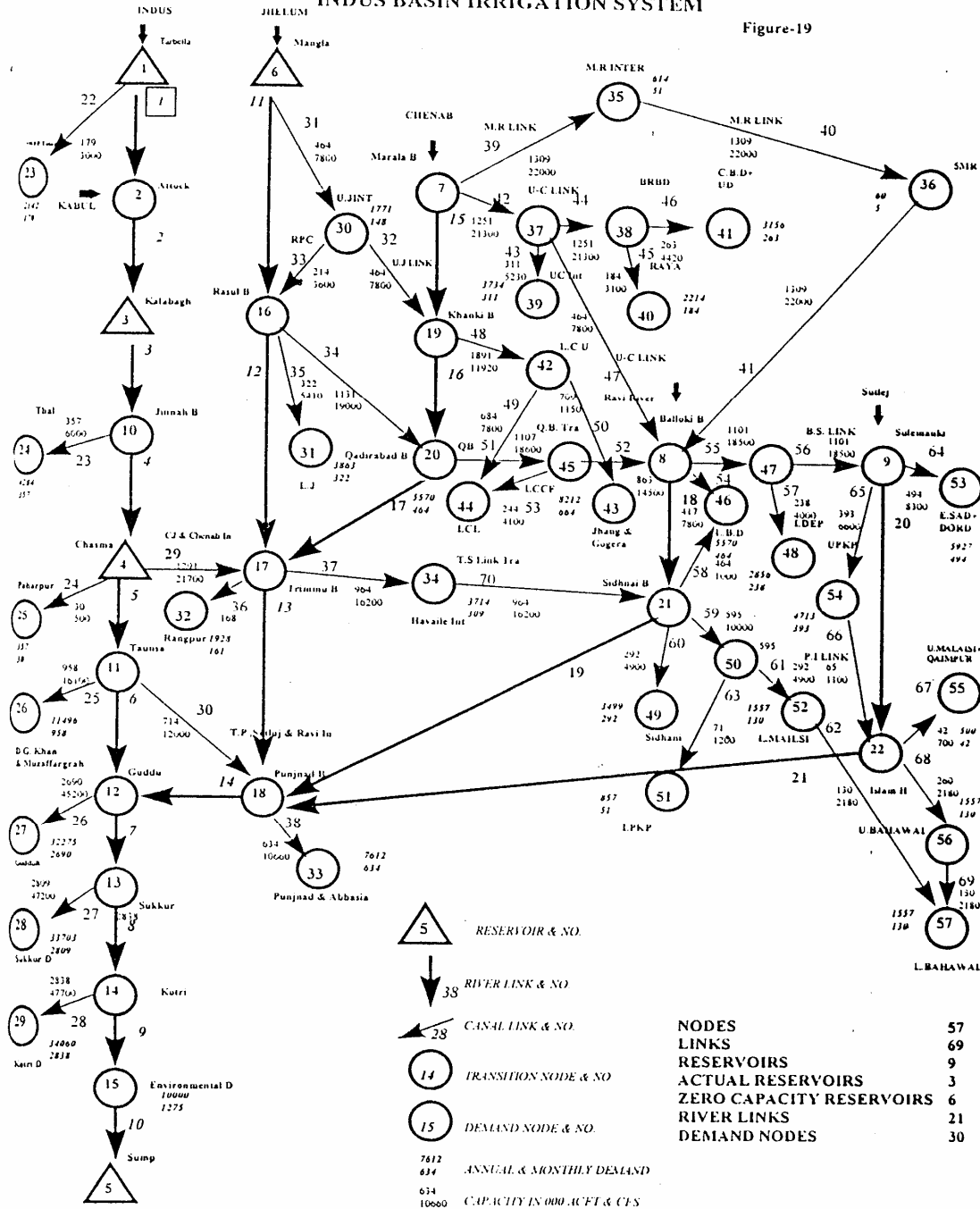
## **The Crisis of Governance**

Kalabagh Dam can be cited as a classic case of environmental insecurity, which has taken a turn for the worse. It typifies government insensitivity, in this particular case, to inter-provincial concerns regarding water availability, environmental degradation and social displacement. An important factor in good governance is decentralized and consultative decision making. By contrast, Kalabagh has been the very antithesis of this, with policy decisions being made in a highly centralized, often secretive, politically coercive and technically flawed manner. Indeed, WAPDA (Water and Power Development Authority), the government agency responsible for large water projects appears bent upon an ex-post vindication of a politically motivated step.

Regrettably, when the need is for broad-based stakeholder consultations, as a basis for informed and democratic decision-making, the existing trend points towards even greater centralization. For instance, the rotating chairmanship of the Indus River System Authority has recently been converted into a permanent appointment; provincial resolutions against Kalabagh have been given short shrift; the Council of Common Interests has consistently ignored the matter; and community concerns continue to be met with blatant disregard. The outcome is that the political leadership in the smaller provinces and civil society are up in arms against Kalabagh Dam, while national policymakers remain intent on making it a reality.

INDUS BASIN IRRIGATION SYSTEM

Figure-19



The present drought situation typifies this alarming blend of arrogance and ignorance. In defiance of all belief, WAPDA continues to lobby for the dam, even as the Indus runs completely dry in the most improbable place, namely, at the confluence of the four main feeder rivers. Suggestions as outré as laser-melting the glaciers are gaining currency in the popular press and matte-finished, ageless generals herald ‘Comprehensive 50-Year Water Master Plans,’ with large dams as the centerpiece. More substantively, Sindh continues to take proportionate reductions in water, with the result that river flows downstream of Kotri to the sea have stopped completely.

In summation, anthropogenic activity that degrades the Indus Basin system’s ecological integrity is an on-going process and a culmination of many factors. It is instigated and sustained by development and demographic pressures. It reflects the imposed dominance of technology over nature. It is an outcome of weak institutions, which succumb to vested interests. It represents a failure to exploit the traditional synergies, practices and interactions between communities and their environment. In the final analysis, such degradation is a symptom of the piecemeal and extractive manner in which ecosystem resources are utilized, and which contrasts with the common sense embodied in Abramovitz’s (1996: 10) remark that, “freshwater ecosystems are the critical link between land and sea, in effect forming the planet’s circulatory system; virtually every human action is eventually reflected in them.” This holistic view, which integrates spatial, biophysical and human dimensions, should form the core of all efforts to manage ecosystem resources sustainably.

In the Kalabagh case, feudal interests on both sides of the divide have proved to be a moderating factor, preventing outright conflict between the provinces. While the institutional arrangements, such as the IRSA, are vulnerable and are being manipulated constantly, enough political pressure is being brought to bear on both sides to ensure that the burden of reduced water remains equally distributed. But it is an uneasy compromise, one maintained by a shaky military government, which can ill-afford another outbreak of inter-provincial discord. For the moment, this consideration has kept even WAPDA at bay. However, when the antagonists fall into different social zones, the scope for intermediation is far more limited, as demonstrated in the forestry case study below.

### ***Deforestation: Communities and Contractors***

Forests have many important economic uses and are a source of livelihoods for communities. In addition, many ecological and environmental imperatives are associated with them. They are a source of biodiversity and, as watersheds, they regulate water and sediment flows downstream. Given their many usages, the need for sustainable forest management becomes almost a truism. Unfortunately, the term is more honored in its breach. The data shows a rapid decline in both areal coverage and the quality of stands. Also, forest degradation has led to a spate of onsite and downstream ravages such as biodiversity loss, erosion and erosivity, flooding and dam sedimentation

The management system, designed for a specific purpose, has been unable to cope with these changes. The multiple, and often conflicting interests of commercial loggers, private developers, government and military agencies, hunters and impoverished communities has placed it under relentless strain. The forest department tends to choose the path of least resistance, coming down with a heavy hand on the disempowered communities and colluding for personal gain and profit with vested interests. Officials have become increasingly vulnerable to outside economic inducements, as opportunities for financial and professional betterment become hostage to fiscal insolvency.

Many factors combine to create a complex of perverse incentives antithetical to conservation: rising prices of timber, fuel wood and forest products; an erosion in the living standards of the forest custodians; fines and penalties which are applied selectively and fail to match the nature of the transgression; and royalties that are appropriated by the rich and powerful. The irony is that commercial and development groups, which management is not in a position to oppose, are making the key inroads into forest resources -- in fact, it cooperates with the transgressors. On the other hand, it has targeted communities, whose needs are of a subsistence nature and who – if their rights and traditions are protected – can work harmoniously with the authorities in the sustainable management of forest.

The box provides an example of how the royalty system, ostensibly designed for the fair distribution of forest benefits is manipulated by the timber mafia to its advantage.

Such malpractices are prevalent in both the NWFP and in the Northern Areas of Pakistan. In Dir-Kohistan, the appropriation of royalties has led to outright conflict. Interestingly, even recourse to the legal system has produced no reprieve, even when decisions ostensibly favoured the communities.

Dir Kohistan is a valley of the Panjkora River, which is more than 70 kilometers long. Kalkot and Lamotai are villages located in the upper portion of the valley. At the end of the 17<sup>th</sup> century, the British government adopted a policy of indirect rule in the area. They delegated local nawabs to govern on their behalf and collect revenues (maaliya) from the communities. Reciprocally, the British turned a blind eye to the nawabs' autocratic rule.<sup>3</sup> However, by and large the communities were allowed to meet their subsistence needs from the forests.

**Forest Royalties in the NorthWest Frontier Province (see 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 induce 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 divided 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,

3 This section is adapted from an in-house case study funded by DIFID.

this allows communities to get the benefits of rising prices

In effect, the timber contractors, elected members and designated community representatives, manipulate the system for profit in collusion with the forest department. Common malpractices are:

- After being awarded a logging tender, the contractor-owner delays logging deliberately in the specified block (coupe) in anticipation of rising prices because he has the financial means to engage the forest department in extended lawsuits. He meets existing demand from his own private stands
- 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.

After independence, Dir Kohistan was merged with Pakistan, coming under the direct authority of the government. Under the new dispensation, the rich forests were declared state property and the communities were promised 15 percent royalty in the income from the forests. Commercial logging began on a large scale. Initially, this was done through contractors, who cut more trees than the legal limit, did not share the proceeds and went so far as to disallow communities, their traditional subsistence rights. Discord began as early as the 1970s, erupting into outright violence, when authorities resorted to force and shot dead a number of community leaders.

The elected prime Minister, Zulfikar Ali Bhutto visited the area and took stock of the situation. He abolished the contractor system replacing it with the Forest Development Corporation (FDC). The community share of the royalties was increased to 60%. This was an enormous windfall, provided the communities were given their due share. As the box above shows, very little filtered down to them.



Growing resentment against the government, the FDC and the contractors finally came to a head in the early 1990s. Village youth banded together to form the “Kalkot Youth Welfare Society (KYWS).” They set up a manned check post to stop all movement of timber outside the valley and both the written and spoken rhetoric became confrontational. The government attempted to diffuse the situation initially. It set up an Inquiry Committee in 1997 to investigate the community’s grievances. The findings of the committee vindicated the community’s stance and advised redress but the district administration failed to act upon its recommendations. Encouraged by its moral victory, the KYWS took its resistance to a new level. A smuggler was shot dead at the check post by the community guards, new check posts were set up and the society organized peaceful marches and sit-ins, first locally in Shringal, Dir and Timergarah and eventually in the provincial capital, Peshawar. However, no resolution of the problem is in sight. The provincial and district governments have adopted a hostile stance, accusing the communities of taking the law in their own hands. An uneasy stalemate prevails at present, with a real risk that the situation will escalate into large-scale conflict.

## Conclusion

Conventionally defined, the term security usually refers to the defense of sovereign states against violent attack, either from other states or from terrorist or revolutionary groups within their borders. Clearly, this impersonal and organized aspect of security leaves little space for the legitimate concerns of ordinary people, who seek security in their ordinary lives. Defined in more generic terms, security connotes conditions that make people feel secure against want, deprivation and violence. Most people desire protection, not only from external and internal violence but also from the threat of disease, hunger, unemployment, crime, social conflict, political repression and environmental hazards.

Environmental security is a subset of human security. Its essence is that human beings, by virtue of their numbers and the magnitude of their activities, are causing bio-geochemical changes in the Earth system that are taking place many times more rapidly than those ... occurring naturally. The term ‘activities’ can be viewed as a catch phrase for unsustainable development processes. Whether they take the form of excess consumption, as in the North, or inequitable and resource extractive development outcomes, as in the South, both contribute to environmental degradation and pollution

Simply put, the pathways to degradation and conflict are as follows. The absence of sustainable human development leads to environmental degradation and to social inequity and injustice. The latter condition increases the vulnerability of the poor to degradation. In turn, the poor are driven to prey upon the environment. This process sets into motion a vicious downward spiral referred to as the poverty-environment nexus. External influences can also be environmentally destabilizing. Pakistan’s performance by sustainable human development criteria has been found wanting. Its social and environmental indicators show a marked degree of inequity, injustice and advanced stages of environmental degradation. It is almost tautological that political and institutional reform is a sine qua non for more environmentally and socially benign development, for arresting degradation directly and for putting in place mechanisms to prevent and mediate conflict.

Two case studies illustrate the insecurity-conflict nexus. An interesting paradox is presented, reflecting the interplay of social and economic forces. In the Dir-Forestry case these forces have established an almost surgical divide between the antagonists. Namely, communities are arrayed against

a consortium of contractors, district administration, forestry department and “community elders”, the last acting to subvert the movement from within. Institutional redress mechanisms (official investigations, judicial recourse) lack transparency. Ultimately, they are subservient to powerful economic forces. There are very real risks that the combination of rapid deforestation and continued exploitation of the communities will escalate into large-scale violence.

In contrast, the Kalabagh study presents a different dialectic. While economic and environmental interests separate the antagonists, the lines of conflict are blurred by their social construction. Powerful lobbies exist on both sides of the divide, both with an interest in increasing water allocations. The government, as is its wont traditionally, defers to these lobbies, resulting in an uneasy compromise. But it is a compromise driven by power rather than environmental or social logic, which underscores its fragility.

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