

# Forest management, environment and development in South Asia

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Forests have always played an important role in human history. Their beneficial roles are clearly acknowledged in many ancient and religious texts of the South Asian countries. For example, Lord Buddha, the philosopher who founded Buddhism, which emanated from and is widely practised in the South Asian countries, said:

The forest is a peculiar organism of unlimited kindness and benevolence that makes no demand for its sustenance and extends generously the products of its life's activity; it affords protection to all beings, offering shade even to the axeman who destroys it.

While forests have always played an important role in human history, their rational management became a priority societal concern in the 1980s in both developed and developing countries. Faced with increasing rates of deforestation, and the attendant problems of loss of biodiversity and other socio-environmental costs, the issue of conservation and rational management of forests became an important item in the agenda of numerous national and international fora. The interest in sustainable forest management was further enhanced because of the increasing realization of the critical role played by forests in terms of providing food, fodder, fuel and wood products for an expanding global population, assisting in soil and water conservation, and influencing global climatic processes.

With the enhancement of public and media interest in high rates of deforestation, especially for tropical forests, not surprisingly proper forest management has also started to attract political attention in most countries. This enhanced interest in forests was primarily responsible for the first ever rejection of a major water development project in any developing country. This happened in South Asia—the Silent Valley Project of India. It was eventually rejected because the project would have destroyed the only remaining tropical forest in India, and would have had adverse impacts on certain endangered species such as the lion-tailed monkey, which survived only in that forest. Following the rejection of the Silent Valley project, the issue of inundation of forests due to the creation of new reservoirs and the resettlement of the people affected has become a very sensitive political and social issue in India, as well as in several other countries of South and South-East Asia. In fact, several recent major water development projects in India, like the Tehri Dam and Narmada Valley, have attracted considerable opposition due

to resettlement and forest inundation problems. Two direct consequences of such opposition have been that projects have started to attract international attention, and their implementation rates have slowed down.

The role of forests in providing commercial products like timber is well known. Because of lack of space this aspect will not be discussed here.

### **Sustainable forest management**

Sustainable forest management has been a difficult goal to achieve because of a variety of complex and interrelated reasons. As a general rule, deforestation has not been caused as a result of direct and deliberate government policies. This, however, does not mean that existing government policies in different countries are optimal for forest management, since such policies could often be substantially improved. It must be admitted that up until recently forest management has neither received the type of priority government attention it deserved, nor the funds required to ensure proper management.

Probably the most important causes contributing to increasing deforestation in the South Asian countries, as well as in other developing countries, are continuing high rates of population growth and the general poverty of their people. If the first factor, population growth, is considered, current estimates indicate that the world population will increase from 5 billion in 1988 to over 6 billion by 2000. Currently, over three-quarters of the global population lives in developing countries, and it is in these countries that 90% of projected population growth is likely to occur, even though economically they are ill-prepared to handle such high rates of growth.

If a South Asian country like Sri Lanka is considered, its population has increased from 3.5 million in 1900 to about 17 million at present, and is expected to reach 19 million by 2000, and 24 million by 2050. Similar, or even higher, rates of population increases are expected in other South Asian countries during the next five to six decades. The position is further exacerbated by livestock population, which is continuing to increase as well. For example, total livestock population in India increased by some 40% during 1951–81, and the goat population actually doubled. Similarly, in Bhutan, the yak population is expected to more than double by 2000.

Such expected increases in human and animal populations in the South Asian countries would mean that more and more land would be used for food, fibre and fodder production, construction of human habitats, and fuelwood collection. Since in all these countries, easily accessible and good agricultural and pastoral lands are already for all practical purposes being fully utilized, the only main source of new land is often forest areas or marginal land. Preservation and/or enhancement of soil fertility in these new areas and ensuring their long-term productivity, generally requires complex land use practices, which are often beyond the capabilities of local farmers due to socio-economic and technical constraints. Accordingly, such expansion of agricultural areas, and thus the increased agricultural

production, could often become a transitory, short-term phenomenon. Reforestation of land areas after their deterioration is not an easy task, due to continuing population pressure and lack of adequate resources.

Shifting cultivation, which is practised in many areas of South Asia, is an important reason for forest destruction. During this process, forests are indiscriminately burnt simply to clear the land for cultivation over a short period, say two to four years. It is an undesirable practice since it seldom provides a long-term solution. It is also a wasteful practice since during this process forest products are not harvested, simply destroyed.

It should be noted that in earlier times, when population pressures on land were not severe, shifting cultivation could have been considered to be a viable practice. Land was allowed to remain fallow for a reasonable length of time in between two consecutive periods of cultivation. With the intensification of population pressures, fallow periods have become shorter and shorter, which means land does not have enough time for proper regeneration. This contributes to a steady decline in agricultural production from the land, and often ultimately could lead to total abandonment of the land due to the loss of its bioproductivity.

In countries like Sri Lanka, shifting cultivation has already been made illegal, and no permits are issued for it. People who used to practise such cultivation are being permanently settled under the large agro-irrigation-settlement schemes like the Mahaweli project. Bangladesh is also attempting to resettle all the shifting cultivators, but the progress thus far has been somewhat slow.

The second factor is poverty. In recent years, considerable national and international attention has been focused on deforestation in the Himalayas, and the consequent adverse environmental impacts in the plains. While the problem is very real and serious, it should be realized that environmental degradation in such areas is an important symptom of a disease, but not the disease itself. The real problem in this case is the poverty of the rural poor, whose numbers are steadily increasing. Since they have no other viable alternative, they are often forced to exploit their nearby environment for their very survival. Poor people in developing countries do not have the resources or alternatives that are available to people from more wealthy countries, who are fortunate enough to consider and practise sustainable use of forests and environment around them.

Poverty and its impacts on environmental degradation are of course not new. Jawaharlal Nehru, the first Prime Minister of the largest South Asian country, India, made this point graphically in 1947:

For a hungry man or a hungry woman, Truth has little meaning. He wants food. For a hungry man, God has no meaning . . . We have to find for them food, clothing, housing, education, health and so on—all absolute necessities of life that every man should possess. When we have done all that we can philosophize and think of God.

One can paraphrase this perceptive observation of the late Indian prime minister and say that unless rural people have access to the basic necessities of life, sustainable

forest management and environmental conservation would be a difficult task in South Asia, as well as in other developing countries, under the best of circumstances.

### **Forests and economic development**

Forests play a major role in sustainable socio-economic development of South Asian countries, both directly and indirectly. While the importance of forest products like timber and fuelwood is generally well known, what is often not fully appreciated is the role played by forests as a provider of food, both directly and indirectly and their secondary and tertiary impacts in terms of ensuring food security and facilitating economic development in general.

For all South Asian countries, forests play a crucial role in terms of soil and water conservation (and thus the productivity of cultivated land, and the reliability of the water supply available for irrigation and other purposes) and as a continuing source of energy in terms of fuelwood as well as large-scale hydropower generation. Sustainability of hydropower generation, a very important source of electricity in nearly all the South Asian countries, depends to a significant extent on rational forest management in the upper catchment areas of the rivers, from where much of their waters originate, and where many of the hydropower sites are located. Regular production of electricity through hydropower often dictates the industrial development policies and production practices, as well as the quality of life in these countries. Thus, it can be argued successfully that forests have important direct and tertiary impacts on the industrial development policies of most South Asian countries.

It should also be further noted that the economies of all South Asian countries are based on proper integration and utilization of their available natural resources in terms of water, soil and forests. Each of these natural resources affects the others, and is in turn affected by them. For example, in an arid country like Pakistan, its main source of water—the Indus river system—is sustained by the afforested watersheds to the north and northwest. Without the waters of the Indus river system, the arid lands of Pakistan cannot be irrigated, and hence food production would decline dramatically, as would hydroelectric production, which is a main source of commercial energy.

Similarly, the main rivers of India, Nepal, Bhutan and Bangladesh originate from the Himalayas, and throughout recorded history the forests have played a major role in providing and stabilizing their sources of water. Reduction of forest covers in their upper catchments in recent years has affected their flow regimes in some important ways. For example, changing vegetative covers have direct effects on rates and patterns of infiltration of rainfall and snowmelt run-off. Some scientists have claimed that reduction in forest covers in the Himalayan mountain ranges of Nepal is increasing both the frequency and magnitude of floods in the rivers of Bangladesh, and in the plains downstream.

However, an even more urgent and serious problem facing all the South Asian countries is the increase in sediment loads of rivers due to reductions in forest covers in upper catchments. Conversion of highland forests to agricultural and

pastoral areas have unquestionably increased the rates of soil erosion. The eroded soil has significantly increased the sediment loads of the rivers, which have directly contributed to two major environmental and economic problems. These are (1) a reduction in the designed lives of the reservoirs due to higher than expected rates of siltation and (2) siltation of the river channels and deltas which may make navigation difficult and hazardous.

Higher rates of siltation due to changing land use practices in the highlands is now a serious problem not only in all South Asian countries, but also in most other developing countries. Sediments carried by rivers are deposited in the reservoirs upstream of the dams, and continually reduce their storage capacities. For example, the two most important reservoirs in Pakistan, Mangla and Tarabela, are losing their storage capacities at annual rates of 48.27 and 167.75 million m<sup>3</sup> respectively. Reductions in the economic lives of such important reservoirs mean that the internal rates of return, as calculated during the planning process, cannot be achieved, which could in many cases render the projects economically inefficient. Furthermore, it has been estimated that Pakistan is currently losing \$130 million annually due to sedimentation in the two above-mentioned reservoirs as a direct consequence of reduction in storage capacities, loss of productive topsoil, reduction in agricultural and industrial production, and additional expenditure for maintenance of infrastructure.<sup>1</sup> This loss is a conservative estimate, since it does not include opportunity cost of the capital or many other intangible social and environmental costs. Much of these losses can be directly attributed to improper forest management policies and practices. In other words, if the forests in upper catchments were properly maintained, such losses—for the most part—would be eliminated.

On a longer term basis, the problem is even more serious than it at first appears. For example, a country like Pakistan simply does not possess many good dam sites which could be economically developed. It can be said as a general rule that not only in Pakistan but also in other South Asian countries, the next generation of dam sites would be technologically more difficult to develop and often likely to be two to four times more expensive to construct in terms of cubic metres of available water, when compared to the last generation of completed projects.<sup>2</sup>

Similarly, extensive recent studies in eight major reservoirs in India (Bhakra, Gandhinagar, Hirakud, Maithon, Mayurakshi, Nizamsagar, Panchet and Tungabhadra) indicate that the average annual sedimentation rate is now slightly more than twice the estimated value that was used for design purposes. This means that the average economic life of these reservoirs has now been reduced very significantly, which in turn indicates that their long-term sustainability and economic and social benefits would be substantially less than initially expected. All these substantial economic and environmental costs could be directly linked to improper forest management upstream and subsequent changes in land use practices.

In addition to losses in the storage capacities of reservoirs which would undoubtedly affect the long-term water availability for irrigation and hydropower generation, high sediment loads in rivers of countries like Bangladesh, due to deforestation in the Nepalese Himalayas, means that rivers and channels have to

be dredged regularly to maintain navigation at very substantial economic costs. The three main rivers of Bangladesh—Ganges, Brahmaputra and Meghna—now carry an annual sediment load of some 2.4 billion tons. Bangladesh Inland Water Transport Authority now has to carry out annually 2 million m<sup>3</sup> of capital dredging and 0.8 million m<sup>3</sup> of maintenance dredging at substantial cost. Without such dredging, navigation would rapidly become hazardous and then impossible. For a poor country like Bangladesh, where river navigation is the main means of transport, increased maintenance of inland transport channels due to increased siltation has imposed a heavy economic burden, which the country can ill afford.

All the above issues clearly indicate that if future agricultural and industrial productivities of the South Asian countries are to be protected and even further enhanced, sustainable forest management in the upper catchment areas of the rivers must receive priority government attention.

For two South Asian countries, Nepal and Bhutan, conservation, development and management of their forest and forest-related resources will undoubtedly dictate their middle- to long-term economic development programmes as well as their overall socio-political stability. In the final analysis, the quality of life of their people cannot be divorced from sustainable forest management.

### **Forest resources of South Asia**

Out of an estimated area of 605 million ha of forests and woodlands in the Asia–Pacific region, nearly 445 million ha (approximately two-thirds) is accounted for by 16 tropical and semi-tropical countries: Bangladesh, Bhutan, Brunei, Kampuchea, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Thailand and Vietnam. Of these, about 292 million ha are closed broad-leaved forests, the most valuable of forest formations in the region. Some 30 million ha of open broad-leaved forests also exist in this region, of which only five countries—India, Laos, Kampuchea, Papua New Guinea and Thailand—account for nearly 80% of the total.

The Food and Agricultural Organization (FAO) of the United Nations has periodically carried out forest resources assessments of the world, including in South Asian countries. The last world-wide assessment carried out took 1980 as the reference year. In March 1989, a new forest assessment study was initiated for the reference year 1990. The final results are expected around mid-1992. When completed, this study will provide consistent and compatible information on the present status of the world's forests. Among the information that would be available are: (1) estimates of forest cover in different areas and the rates of deforestation at global, regional and sub-regional levels; (2) reliability of the various estimates made; and (3) a matrix of change information for better understanding of how land use patterns are evolving.

Initial estimates are now available for the current forest covers and rates of deforestation at various Asian sub-regional levels. These are shown in Table 1. Estimates of deforestation in various sub-regions around South Asia are shown for comparative purposes.

**Table 1. Preliminary estimates of forest areas and rates of deforestation in Asia**

Sub-region	Number of countries studied	Forest areas <sup>a</sup> (million hectares)		Areas deforested annually (million hectares) 1981–90	Rate of change, 1981–90 (%/year)
		1980	1990		
South Asia	6	70.6	66.2	0.4	-0.6
Continental					
South East Asia	5	83.2	69.7	1.3	-1.6
Insular South					
East Asia	4	157.0	138.9	1.8	-1.2
Asia	15	310.8	274.9	3.6	-1.2

The preliminary estimates available at present indicate that deforestation continues to threaten the forest resources of South Asia, even though percentage annual reduction of forest cover in this sub-region at 0.6% per annum is significantly less than in continental south east Asia (1.6% per annum) or insular south east Asia (1.2% per annum). The average annual rate of change of the 15 Asian countries studied was estimated at -1.2%, which was higher than Latin America (32 countries studied; annual rate of change -0.9%) or Africa (40 countries studied; annual rate of change -0.8%). This means that if the present average annual rate of deforestation continues in Asia, all its forest resources could disappear within a time span of some 50 years, which undoubtedly is very short when compared to the long history of the various Asian countries. It should also be noted that the total area which is being deforested annually in Asia in 1990 is significantly higher than the earlier 1980 estimate. Pronounced deforestation was noted in 1990 in South Asian countries like India, as well as other nearby Asian countries, including Indonesia, Myanmar, Philippines, Thailand and Vietnam.

In this context, it should also be observed that substantial and significant efforts have been made in the South Asian countries to increase reforestation in recent years. Reforestation efforts are taking place under four general but interrelated categories. These are: (1) block plantations funded and implemented by government agencies on forest land; (2) reforestation of areas other than forest lands by government and/or community efforts; (3) plantations by companies and private individuals on land either owned by them, or taken on lease, or on communal lands; and (4) homesteads and family wood lots, scattered trees, and trees in combination with crops.

During the period 1951–91, reforestation in India amounted to some 16 million ha. In recent years, India has been reforesting 1.5 million ha annually. Similarly, in Bangladesh, cumulative area afforested up to 1990 amounted to some 336 000 ha. In Myanmar, 331 000 ha of plantations were established between 1968 and 1990.

With increasing public and government interest in sustainable forest management, it can be said with considerable confidence that for the first time in the history of forestry an accelerated effort has been directed, both nationally and internationally, towards reforestation and thus rebuilding of the forest base. If the present

trends are any indication, reforestation is likely to gather even further momentum in the coming years.

### **Forests, wildlife and national parks**

A network of national parks and conservation areas have now been established in all South Asian countries for the conservation and protection of forests and wildlife. The main objective is to protect important examples of diverse ecosystems as national heritage. The areas that are currently identified as national parks and equivalent reserves in the various South Asian countries are:<sup>3</sup>

Bangladesh—four national parks; Bhutan—13 protected areas (978 200 ha), including one national park, three wildlife sanctuaries, three wildlife reserves and six reserved forests; India—69 national parks (3 million ha), 410 wildlife sanctuaries (10 million ha) and 11 'Project Tiger' areas; Nepal—seven national parks (864 000 ha), four wildlife sanctuaries (97 000 ha) and one conservation area (266 000 ha); Pakistan—10 national parks (968 000 ha), 84 game reserves and 83 wildlife sanctuaries (2.75 million ha); Sri Lanka—11 national parks (460 000 ha), five nature reserves (64 000 ha) and 50 sanctuaries (256 000 ha).

Overall protected areas in the various individual South Asian countries are quite significant. For example, they now account for nearly 7.5% of the total land area of Nepal and 4% of India. Furthermore, the need and importance of protected areas are now being increasingly recognized, and accordingly total areas protected are continuing to increase.

While overall the extent of areas protected looks encouraging, there are some conservation-related problems which need to be resolved. For example, it has been noted<sup>4</sup> that for India: 56% of parks and 72% of the sanctuaries still have human populations within their boundaries; 43% of parks and 68% of sanctuaries still have rights and leases (grazing, cultivation, habitation, pilgrimage, etc); 39% of parks and 73% of sanctuaries allow grazing of livestock; 67% of parks and 83% of sanctuaries have illegal grazing; and 16% of parks and 43% of sanctuaries allow timber harvesting.

One of the main constraints facing the South Asian countries is that the local people and their leaders living around the different protected areas still do not fully understand why such special areas have been created, and how they could be of benefit to them. Unless people clearly understand the goals and objectives of protected areas, and poorer sections of the population have access to other resources, they continue to use and degrade the protected area systems. Poor people do it out of necessity to eke out a meagre livelihood, since they may not have any other choice.

In spite of these constraints, protected areas have already served a very useful purpose. The scale of human impact may mean that many protected areas may be of smaller effective size than generally indicated, but they generally have an inner core where natural forests and biodiversity can be maintained. Hopefully, with time, this situation can be further improved.

## Forests and energy

Forests play an important role as providers of energy, from large- to small-scale and both directly and indirectly. Large-scale energy production is facilitated by the important role played by forests in water conservation, a subject discussed in some detail earlier.

Fuelwood is an important small-scale and decentralized source of energy in all South Asian countries. For example, in a country like Bhutan, it is estimated that 97% of the total energy consumption is accounted for by fuelwood. It is the principal fuel for cooking and heating, almost exclusively so in rural areas. Because of easy access to forests all over the country, and an abundance of wood, per capita fuelwood consumption in Bhutan is one of the highest in the world.

In Sri Lanka, it is estimated that fuelwood provides nearly 70% of the country's energy requirements, and over 90% of household energy needs. However, much of the fuelwood (about 80%) comes from non-forest sources, including crop residues, and the balance (nearly 20%) from forests. In order to further reduce the pressure of forests, there is an urgent need for an aggressive and effective social forestry programme. Sri Lanka is now persuading certain types of industry to grow their own fuelwood, especially for drying tea, curing tobacco, manufacturing bricks and for use by food-processing industry.

Similarly, for Pakistan, it was estimated that annual per capita fuelwood consumption in 1988–89 was 0.2 m<sup>3</sup>. This means that the total annual national consumption was 21.15 million m<sup>3</sup>, of which 2.21 million m<sup>3</sup> came from the forests and the balance, 18.94 million m<sup>3</sup> from farmland.

In India, the estimated demand for fuelwood is about 150 million tonnes, whereas recorded production from known sources is around 50 million tonnes. This gap of some 100 million tonnes is primarily made up from natural forests and woodlands around urban centres. Fuelwood is collected not only for domestic consumption by collectors but is also sold as a source of income by a large number of people. This extensive fuelwood collection process has often meant serious forest degradation around urban centres.

While the need of fuelwood for the rural people of South Asia cannot be denied, there has to be a balance between fuelwood generation and collection. Unless such a balance can be achieved, existence of all forests around centres of population will continue to be threatened.

## Conclusions

Even though sustainable forest management has already become an important issue in South Asia, all the indications are that it will become an even more critical issue in the 1990s and beyond. The two conventions that were signed by many countries at the recently completed United Nations Conference on Environment and Development at Rio de Janeiro, Brazil, were on climate change and biodiversity. Both of these conventions have important implications in terms of forest management, which—hopefully—all the countries signing the conventions, including

the South Asian countries, will start to implement in the near future. The conventions will have very limited value until and unless the countries signing them have the political will and adequate resources and expertise to live up to their obligations.

Technically speaking biodiversity in South Asia as well as in the rest of the world simply cannot be maintained without significant changes in the existing forest management practices. While some time ago it was expected that a forest convention would be ready for signature by the various countries at Rio, the idea had to be dropped because of the complexities associated with the subject as well as paucity of time. It is highly likely that the momentum for a forest convention will build up again after the Earth Summit at Rio.

All the events leading to Rio and the discussions at Rio have made clear the importance of interrelationships between forest management, environmental conservation and development of the Third World countries. These three factors are also major issues for the South Asian countries. The future of the South Asian countries will be determined not by one of these single issues but by the interactions between them, as well as by important factors such as increasing population growth. Each of these issues has considerable influence on the others, and is in turn affected by others. Thus, increase in population of the South Asian countries would require more food, energy and forest products. Increasing food supply would require more horizontal expansion of land as well as increasing yields per hectare. The sustainability of the food production system would require more efficient, simultaneous management of land, water and forest resources. The common requirements of all the practical responses to the potential solutions of these important issues must include greater investments, better technology, higher levels of expertise and more intensified regional and global cooperation.

Within these general interrelationships, the South Asian countries must develop their own individual responses. To achieve sustainable forest management, the countries must view it multi-sectorally in terms of overall linkages between people, resources, environment and development. It will not be an easy task, but one that must be accomplished if the existing forest resources of the South Asian countries are to be maintained, or even increased.

### Acknowledgement

The author gratefully acknowledges the advice given and information provided by Dr M. K. Muthoo, Director, Forestry Operation Service, FAO, Rome, without whose assistance this article could not have been written.

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