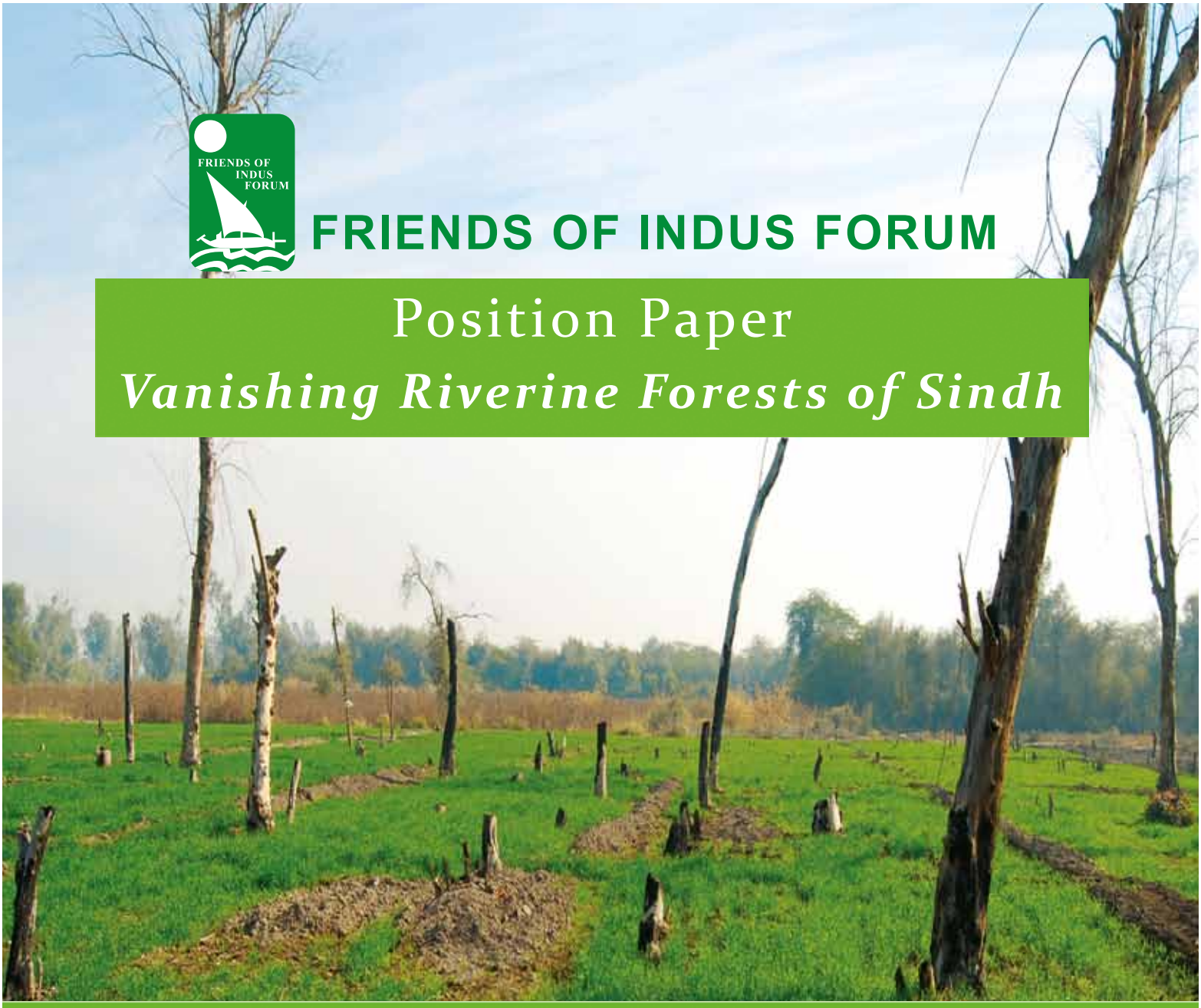
FRIENDS OF INDUS FORUM

Position Paper

Vanishing Riverine Forests of Sindh



Conversion of forest into agricultural land is rampant in Sindh

Forests in Sindh province account for 2.29% of the land area.[1] They owe their existence to Indus River, and extend along: the *kacha* tract located between earthen embankments adjoining the winding course of the river (riverine forests); in the command area of Sukkur, Guddu Barrage and Kotri Barrage network (irrigated plantations); in the swampy areas of the deltaic region lying beyond the river's mouth (mangrove forest); and on the alluvial deposits that are carried along with the flowing water from upstream catchments.

Riverine forests together with irrigated plantations constitute the productive forests of the province, and provide commercial timber and firewood. Studies on the riverine ecosystem upstream Sukkur and downstream Kotri explore cause of forest degradation, its impact on the ecosystem and measures for its improvement and restoration.[2] These studies suggest that forest conditions and cover have degraded significantly over the years due to inadequate inundation supplies and other natural factors, such as resource overuse, mismanagement of forest space and other anthropogenic factors.

To bring attention to these matters, this position paper addresses policy makers, conservation activists, intellectuals, development agencies and practitioners, academia and other concerned citizens. It highlights the factors responsible for the current status of riverine forests in Sindh. It further identifies strategies for the conservation of these forests, and provides immediate, short term and long term recommendations at local and policy levels for improvement of the current situation.

PC-I Form, Government of Sindh Planning and Development Department, 2005
Study of Riverine Forests Upstream Sukkur and Downstream Kotri, Indus for All Programme, WWF 2008

FORESTS OF SINDH

The total land area of Sindh is 14.091 million hectares[3], which constitutes 17.7% of Pakistan. The province has three distinct physical regions: alluvial plain located in the center, rocky region in the west, and sandy desert in the east. After agriculture, forestry is the other major land use in the centrally located plains. The different type of forests in Sindh are discussed below. (see Figure 1)

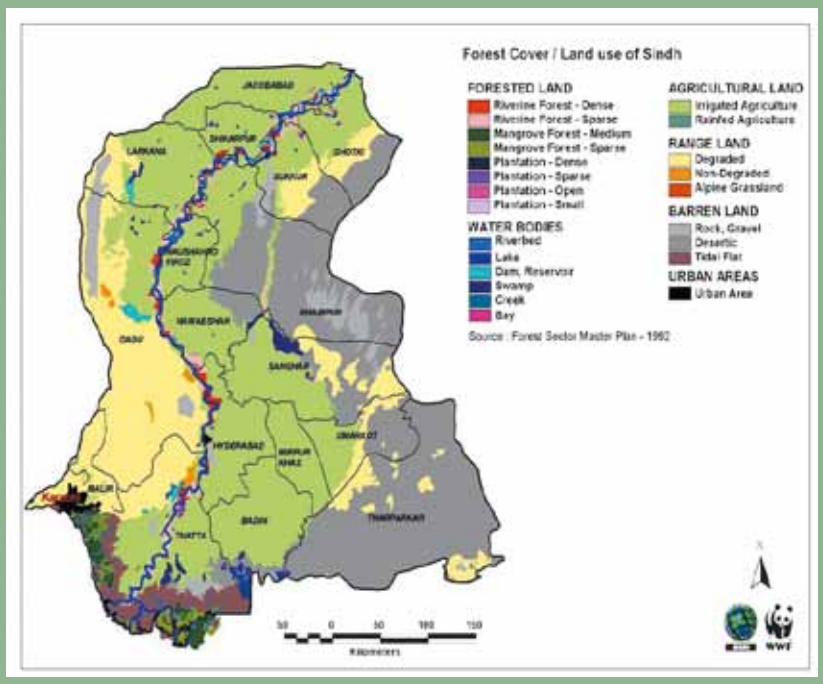
PRODUCTIVE FORESTS

Riverine Forests: These forests grow all along Indus River and form one of the important components of the riverine belt. They owe their existence to the flooding / inundation of the river and are located in district Ghotki, Sukkur, Khairpur, Naushahro Feroze, Shaheed Benazirabad, Hyderabad and Thatta on the left bank between flood protection embankments and the river, and in districts Kashmore, Shikarpur, Larkana, Dadu, Jamshoro on the right bank of the river. Some forests overlap on both sides of the active river. The table below gives details on riverine forests distribution in Sindh[4].

Table 1: Forest Areas in Sindh[5]

DISTRICT	AREA (hectare)
Ghotki	6,210
Sukkur	43,173
Khairpur	11,980
Naushahro Feroze	14,957
Shaheed Benzirabad (formerly Nawabshah)	22, 994
Hyderabad	34,504
Thatta	23,322
Total	157,141

Figure 1: Type of Forests in Sindh



Irrigated Plantations: The concept of irrigated forestry was introduced during the British rule, with the objective of supplying firewood to railway, steam boats and ships, and fuelwood for military cantonments. With the construction of three barrages on the Indus River, diversion of river water for agriculture, canal water was allocated for many inland forests to convert these into irrigated plantations.

PROTECTIVE FORESTS

Mangrove Forests: Sindh has a 342 km long and 50 km wide coastal belt along the coastline of the Arabian Sea, covering an area of appoximately 600,000 hectares.[6] These forests are not productive in terms of timber and fuelwood, but their protective role is significant. They serve as breeding grounds for fish and shrimp, protect Karachi and Bin Qasim ports from silting and tsunamis, and provide livelihood services to coastal communities.

Rangelands: They occupy about 62% of the total land area in Sindh and comprise of vast expanse of Thar Desert and hilly tracts of Kohistan in Kirthar Range. They depend completely on sporadic and scanty rainfall, and also form habitats for a variety of indigenous and migratory birds, wild mammals and reptiles.

[3] PC-I Form, Government of Sindh, Planning and Development Department, 2005
[4] PC-I Form, Government of Sindh Planning and Development Department, 2005
[5] Study of Riverine Forests Upstream Sukkur and Downstream Kotri, Indus for All Programme, WWF 2008
[6] Water Sector Improvement Project Phase-I, Sindh Irrigation and Drainage Authority, 2007

THE RIVERINE ECOSYSTEM

Riverine forests are floodplain forests located along the river, between embankments from Kashmore in the north and Keti Bunder in the south. These forests have a definite landscape with the soil, climate and set of organisms that make it a typical forest ecosystem. Its total environment includes the climate, physical components of the soil, topography and all the other organisms that help or hinder them, feed them or feed on them, protect them, are protected by them or are dependent upon each other. Any positive or negative influence upon any component of the system results in an imbalance in ecosystem function and productivity.

Like other type of forests, riverine forests are a vital component of the land ecosystem that lessen the impact of diurnal temperatures, sequester CO2, and retain soil moisture. Abundant grasses, wild herbs, shrubs, etc. growing after floods and rainfall provide fodder for the livestock and wild animals. There are several *dhands* (natural lakes) and *dhoras* (abandoned river beds) in the riverine areas, some of which store water round the year and are a source of food (e.g. fish) and employment. In addition, these forests produce honey, gum, lac, medicinal herbs and bark for tannin. The growth, upbringing and regeneration of riverine forests is dependent on annual floodwater availability and soil conditions. These factors influence the distribution and growth of all tree species.

FACTORS RESPONSIBLE FOR DEGRADATION OF RIVERINE FORESTS

Historically, the riverine ecosystem of Sindh was productive and hygienically viable, but climatic change, socioeconomic pressures and disturbances caused by natural and anthropogenic factors has significantly depleted and degraded this ecosystem.

1. Unavailability of inundation water

Although the main factor responsible for degradation of the forests is the reduction or unavailability of inundation water in riverine ecosystems - located upstream Sukkur and downstream Kotri – socioeconomic factors also play a critical role. This includes pressure on the forests due to a growing population, as well as their occupational dependency. A comparison of factors responsible for degradation of riverine ecosystems reveals that Keti Shah riverine forest ecosystem is still rich in biodiversity and other components but Kathore / Hayat Gaho riverine ecosystem is completely degraded. As per an estimate people are dependent on riverine forests to the extent of 50%, for goods, services and livelihood needs.

2. Climatic conditions

There has also been significant deterioration in riverine ecosystem due to climatic factors. Scanty rainfall and periodical temperatures have influenced the overall climate of the lower Indus plain, which ultimately influences the riverine ecosystem in that area. Also, the construction of upstream reservoirs has significantly reduced the intensity, extent and frequency of annual flooding. Diversions on the Indus due to installation of canals and link canals have worsened the situation.

3. Social factors

In some areas, literacy rate above the age of 10 years is low, and is the root cause of several social and economic evils. People do not understand the importance of trees and commit offences of excessive cutting, overgrazing, encroachments etc. for their meager monetary benefits. Due to language barriers in understanding new technologies, people's participation in afforestation activities is also minimal. Furthermore, forest fire is common and tree growth is not fire-resistant. The productive capacity of some of the soils has also degenerated gradually, affecting reforestation and management practices.

4. Over-cutting and over-growing

Factors damaging the riverine ecosystem are overgrazing by livestock, which in general adversely affects and hinders the growth process, and development of principal tree species in riverine belts. Trees are being ruthlessly cut and forest lands cleared to cater to growing cultivation needs. Wooded lands, especially riverine forests, have remained hideouts for dacoits for decades, leading to further clearing of trees. Additionally, cases of unauthorized encroachments, cutting of trees and theft of wood have become common and uncontrollable, which has played havoc with the wooded area of riverine forests.

Multiple uses of tree species have increased forest vulnerability; trees provide firewood, fodder, pods, poles and branches etc. Insects, defoliators and diseases also attack leaves and bore in to the stems and roots, while pests cause occasional defoliation in the forests.

5. Unsustainable lease policies

Prior to 1975, the problematic forest areas were leased out for development and cultivation purposes to local small farmers who abided with terms and conditions of the agreement to develop the forest land, arrange irrigation water and raise seasonal crops during lease period. In 1979, Sindh Forest Department introduced a new system in which the term of agreement was just and well suited for the benefit of the co-workers. It was followed by the 1983 policy, which was purely designed for the benefit of the people and Sindh Forest Department had no effective control on the lease. Under the 1991 policy, forest land was granted to lease holders for raising agriculture crops only from the approved lease-areas schedule in the riverine forests and irrigated plantations. Finally, under the latest policy of 2004, the land is granted for a period of five years, extendable for another 5 years, in the riverine and irrigated forest area, with a condition that the lease holder shall bring 25% of the leased land under block plantation within the first 12 months of the lease. It is understood that like the previous policies, this policy instead of improving tree growth will aggravate the existing degraded ecosystem with further loss of productivity. It was initiated in 2005 and is still continuing, but has still not been evaluated in terms of its success and sustainability.

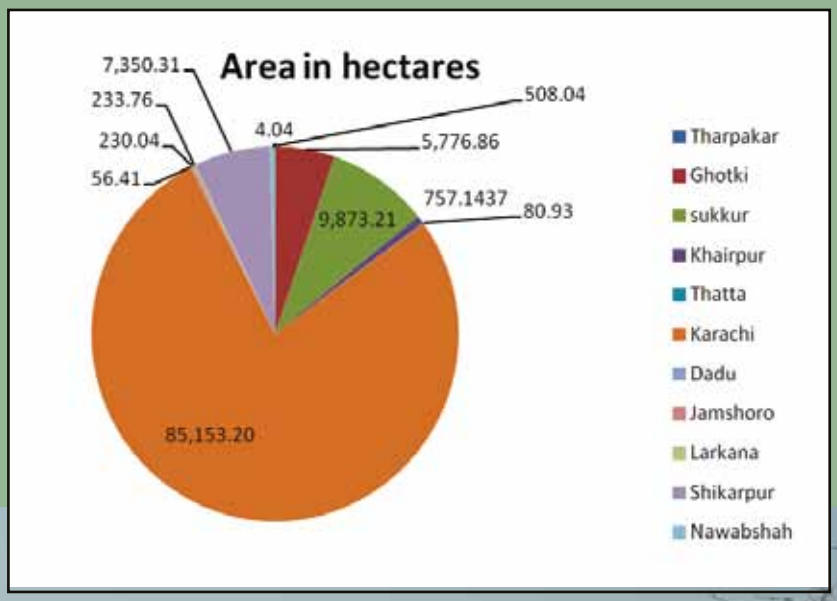
6. Conversion of forest into non-forest land

An assessment using satellite images was recently conducted by Ministry of Environment. It revealed that forests have declined by 19% to 3.44 million hectares since 2001, with a 0.36% average rate of deforestation. Laws and rules on the management of forests are not adequately restrictive and prohibitive in Pakistan, particularly given the country's low and decreasing forest cover. This has resulted in the misuse of forest land and their conversion to non-forestry use. The highest rate of deforestation has been found in Indus Delta mangroves, which have depleted at a rate of around 2.3%. This is followed by coniferous forests and riverine forests. Table 2 shows the province-wise transfer of forest land to other departments, which is indicative of a pervasive trend showing compounding decline in forest cover in Sindh in particular and Pakistan in general.[7]

Table 2: Province-wise transfer of forest land to other departments[8]

PROVINCE	AREA TRANSFERRED (hectares)
Sindh	110,024 (271,875 acres)
Punjab	40,351.79 (99,711.29 acres)
Baluchistan	5,541.64 (13,693.68 acres)
Khyber Pukhtunkhwa	3,922.29 (9,692.17 acres)
AJ &K	233.50 (577.00 acres)
Total	160,073 (395,549 acres)

Graph 1: District-wise detail of forest areas transferred to other departments in Sindh



Highest rate of deforestation has taken place in the Indus Delta Mangroves

[7] Conversion of Forests to Non-Forest Uses in Pakistan, WWF 2010

[8] Conversion of Forests to Non-Forest Uses in Pakistan, WWF 2010

Forests in Sindh owe their existence to Indus River

RECOMMENDATIONS

Given the circumstances, there is a strong need to formulate a dynamic policy for preservation and management of riverine forests, which is the mainstay of forestry in Sindh. Various studies have revealed that reduced floods, land greed and mismanagement of areas receiving inundation, coupled with other natural and anthropogenic factors, are the main causes of degradation of riverine ecosystem. The present management strategies and policies need to be modified to expand management responsibilities of forestry personnel to include human ecology and conservation. The problem needs to be tackled at multiple levels i.e. community, government and policy.

Immediate on-ground interventions

- Ensure a regular supply of fresh water, to maintain a healthy ecological balance. Fresh water washes out contaminants from the polluted soil in the river bed, and brings fresh silt and fish seed to rejuvenate it.
- Develop a seed bank where large quantity of quality seeds is stored for planting, sowing and supply to farmers.
- Sindh Forest Department should earmark some of its high lying areas for long-term leasing to industrialists, to raise plantations for raw material for wood-based industries.
- Areas under the most intense environmental and social pressures needing protection should be determined, and bilateral and multilateral assistance should be coordinated to strengthen forestry sector planning and management.
- Forest lands should not be transfared for non-forest use.

Short term on-ground interventions

- A detailed and multi-sectoral survey of the area should be conducted to assess problems affecting the area and its residents. The results of this survey should be used to establish priority actions to rehabilitate forests and resident communities.
- Management plans should be implemented. It should include strategies prepared by Forest Department on proper management of riverine forest lands.
- Alternative income generation opportunities and micro-credit facilities need to be provided to inhabitants who have lost their livelihoods as a result of the environmental degradation of riverine forests.
- Conservation areas should be identified for research, to evaluate the effect of human use and habitation on the sustainability of ecosystems.
- A databank should be created in the Forest Department, with information on factors affecting riverine forests, such as ecological, social, economic, technical, biotic and edaphic.

Medium term policy interventions

- Increase organizational effectiveness through enhancing monitoring and evaluation achieving, ecosystem health and sustainability and expanding collaboration among researchers, scientists and practitioners.
- Apply adaptive management approach to engage local communities and help them accept new approaches to technical, administrative and social issues which can be developed and tested for integrating and achieving desired ecological, economic and social objectives, with the objective of improving knowledge on ecosystem management.
- Encourage application of the ecosystem management approach, which is a concept of natural resource management wherein the forest activities are considered within the context of economic, ecological and social interactions within a defined area or region over both short and long term.
- The principle of development in riverine forests should be to combine conservation with development, for which incentives should be provided by the government to promote farm forestry on private lands and community based woodlots on state lands.
- Forestry extension services should be strengthened and reorganized to provide technical and material assistance to farmers for the promotion of tree growth in riverine tract, marginal and wastelands through people participation.

Long term policy interventions

- The cause of degeneration in the recent past has been the lack of political will to bring any change for the betterment of natural resources. If the law and order situation is improved and security is provided to the civil society, riverine areas can be developed as fascinating recreation places for urban population that can afford to, or needs to get out of concrete jungles for some time. It is also important to allow forestry personnel to enforce the writ of law in vacating encroachments and check wood-cutting in forests.
- The agroforestry lease policy, which is one of the main tools for developing and managing riverine forests, should be implemented in its true spirit.
- Research needs to be carried out in the following fields:
  - Technical, biological, socio-economic and policy aspects to raise the productivity of riverine species for meeting basic rural needs.
  - Causes of success and failure in forest development.
  - Community management, production, forest dependency, sustainable utilization, equity and benefit sharing in marketing aspects of forest resources.
  - Forest products marketing channels from collectors/producers to consumers subsistence and local use analysis as well as comprehensive inventories.
  - Impact of and measures to address water shortage on forest resource, particularly on biodiversity and ecosystem functions measures to make the ecosystem functional and productive.
  - Supply and demand analysis of main forest products and non-wood forest resources currently and in the future.
  - Appropriate technologies for non-wood forest products, their harvest, use and processing.
  - Identification of monetary values of different forest types, based on Ministry of Environment / WWF - P / FAO manual on forestry valuation. The per hectare values could be used by planners to apply cost-benefit analysis to prioritize competing use of forests, justify budgetary allocations and develop indicators to monitor depreciation of forest stocks.

FRIENDS OF INDUS FORUM

OUR VISION

Ensuring prosperity for current and future generations of Indus Basin, particularly lower riparian, through co-existence and harmony with nature

AIM

To address the multiple factors that threaten the naturalecosystems in which survival of species is becoming increasingly difficult, and in which dependent communities are pushed to poverty and despair

This position paper has been published by Friends of Indus Forum
with technical and financial support of Indus for All Programme , WWF - Pakistan

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