



FRIENDS OF INDUS FORUM



Indus River Kotri devoid of water at downstream

Position Paper on Water in River Indus downstream Kotri

Summary

Indus Delta is the fifth largest in the world¹. Once, due to its richness in biodiversity, countless species of fisheries, wildlife and plants, it is one of the vital ecosystems in Pakistan. The deltaic communities, now comprising half a million people, developed the wisdom to judiciously utilize these resources and maintain sustainability of the system for centuries. The delta owed much of its grandeur to freshwater flows of River Indus. The freshwater along with millions of tonnes of silt deposition, over a long period of time formed a vast fan shaped area of 600,000 hectares, along the coastline of the Sindh, southern province of Pakistan. However, with the passage of time the delta has undergone severe degradation because of the upstream diversions of Indus River water resulting in what can be termed as one of the worst examples of human interventions in nature.

1. Background

Deltas are a unique feature of coastal ecosystems. The triangular alluvial deposit that is formed, whenever a swift stream or river empties into an ocean is called a delta.

The word 'delta' originates from the Greek letter (delta), whose shape the landscape resembles. This triangular shape and the great width at the base are due to blocking of the river mouth by silt, which results in continual formation of distributaries at angles to the original course. Deltas are usually characterized by highly fertile soil. In Pakistan, the Indus delta developed where the Indus meets the sea in Sindh's coastal region. Named after the Mighty Indus River, this delta is called the "Indus Delta".

The Indus Delta is one of the largest areas of arid climate mangroves in the world and is the fifth largest delta in the world. It is situated on the borders between Pakistan and India. It is a typical fan-shaped delta, built up by the discharge of large quantities of silt washed down the Indus River from the Karakoram and Himalayan mountain ranges. Its formation was characterized by high river discharge, moderate tides and high wave energy conditions.

The Indus Delta occupies an area of about 600,000 ha, consisting of creeks, mudflats and mangrove forests between Karachi in the north and the Rann of Kutch in the south.

¹ <http://www.ramsar.org>

There are 17 major creeks making up the original delta. The Indus Delta ecosystem has been rich in nutrients that provide a nursery and an early feeding ground for a large variety of shrimp and fish. The dense forests are mostly located in the pockets created by the creeks. At times the delta has moved southwards and westwards by rates between 4–30m/year due to a silt discharge of over 400 million tonnes per year. However, with the increased abstraction of water upstream, the quantity of silt reaching the delta has drastically reduced². At present the apex of the delta is to the south of Thatta. Presently, the active delta is only 10% of its original area.

2. Reduction in the Indus Flows

Records from the nineteenth century suggest that freshwater flows to the lower Indus were around 150 million acre feet (MAF) per year. Some flow occurred all year round, with higher flows starting in March, peaking in August, and declining in November. However, after independence, much emphasis was given to development of the agriculture sector. With the expansion of agriculture, more and more land was converted to agriculture use. In this process of transformation, natural vegetation, which originally occupied that land, was destroyed for cultivation of agricultural crops.

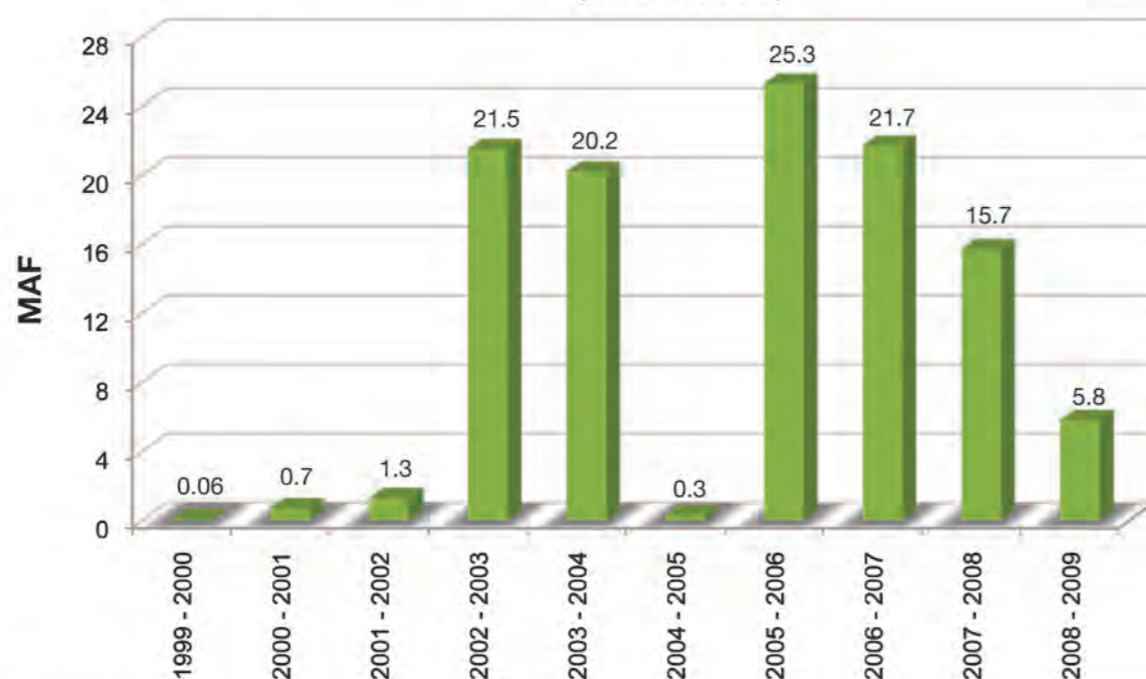
Expansion of agriculture and subsequent industrial development led to diverting water for agriculture purposes



Cyclones and sea storms cause heavy losses in the Indus delta

² <http://www.worldwildlife.org/wildworld/profiles/g200/g156.html>.

Annual Release of Fresh Water in River Indus Downstream Kotri (1999-2009)



Source: Irrigation and Power Department, Government of Sindh

and power generation through the construction of reservoirs on the Indus and its tributaries. Economic priorities overruled ecological consequences that were bound to follow in years to come. An intricate system of canals, barrages and reservoirs was constructed to transfer supplies from the Indus, Jhelum and Chenab rivers to the areas formerly fed by eastern rivers, to compensate for water supplies lost to India under the Indus Water Treaty signed between India and Pakistan in September 1960. The Warsak Dam was constructed in 1965, followed by the Mangla Dam in 1967, and the Tarbela Dam in 1976.

These constructions have affected water flows reaching Sindh, especially to the coastal region of the province. The average annual flow downstream Kotri between 1955 to 1966 was 79.9 MAF, which was reduced to 46.0 MAF after Mangla Dam and prior to Tarbela Dam and further reduced in the post Tarbela period to 35.2 MAF. There has also been a 72.4 % decrease in sediment flow downstream Kotri over the period of 60 years.

Interestingly, despite assurances, the flows downstream Kotri barrage has remained drastically low during recent years. The figures speak for themselves. The estimated freshwater flow down the Indus was about 150 MAF per year in the past. The Indus had also been carrying with it

some 400 million tons of silt³. However, over the last 60 years after the construction of dams, barrages and reservoirs, the freshwater flow has reduced to less than an average of 30 MAF, while silt discharge is now estimated to be 100 m tonnes per year, falling to about 30 million tonnes annually. For example, in 1999-2000, flows downstream Kotri Barrage were recorded at 8.83 MAF which were further reduced to 0.72 and 1.925 MAF during the years 2000-2001 and 2001-2002 respectively. This has inflicted heavy losses on the ecology, biodiversity as well as livelihood resources of the Indus Delta.

3. Consequences: environmental and social

The political economy of water resources development and management in Pakistan has shifted benefits from the Indus Delta to upstream users. Once rich, these deltaic communities have been made poor by policy decisions. The policy paradigm for water resources development, since the last century, has brought several negative consequences for this area.

The resulting degradation manifested itself in reduction of mangroves coverage (important fish habitat), declining fish stocks, shrinking agricultural land and vegetation, vertical and horizontal intrusion of sea, degraded ground water, and significant reduction in livestock grazing areas. Second, intensive agriculture (through flood irrigation) supported by water, which was held upstream through dams and barrages, and distributed through canals and distributaries, gave rise to agricultural wastes, which ended up in the delta. This on the one hand ruined the communities of an area on the pretext of developing other areas through the increase of agricultural production; on the other, it caused degradation of the lands upstream through waterlogging and salinity.

This water resources development paradigm never considered environment as a legitimate water user.

³ Sikandar Brohi, Degradation of Indus Delta and Its impact on local communities, Actionaid 2004.



Vanishing mangroves: consequences of reduced flows

Moreover, universally accepted rights of lower riparian were violated. The disaster as a consequence of such policy decisions was neither addressed by the government nor aid agencies. Some of the specific human and ecological consequences are mentioned below:

First, mangroves — the guardians of Pakistan's coast and the identity of Indus Delta — are lost. The Indus Delta was home to almost 97 percent of different species of mangroves. Local communities used them for fuel wood, timber, fodder, grazing of livestock, etc. Mangroves are breeding grounds for commercial fish species, such as shrimps, crabs and lobsters and protect the harbour against erosion, tsunamis, strong winds and cyclones. Mangroves are also essential in the changing climatic conditions, in which the frequency of cyclones has increased. Clearing this shield will make coastal towns and communities more

vulnerable to natural disasters. Before the deterioration of the Indus Delta, 260,000 hectares of land was covered with eight species of mangroves. Half of this area has been lost and only four species out of eight have survived. Of these four, *Avicennia marina* (Timer) constitutes 95 percent of the current mangroves cover.

Second, coastal poverty, hopelessness and despair are rampant. Poor communities having no other income sources are putting pressure on fishing and mangrove resources. The interlocked fish market and indebtedness have further aggravated the situation. The trend of migration is also on the rise — villages are being inundated due to sea intrusion compelling locals to migrate to large cities especially Karachi, hence increasing pressure on urban centers. Keti Bunder is an example of a town that has experienced out-migration due to constant threat of cyclone and severe

weather conditions. Today, the once bustling port town, has only 2,000 inhabitants left.

Third, losses to ecosystem functioning and services are large and irreparable. Several habitats and ecosystems are lost and so are the ecosystem services. The shrinking of ecosystem services has seriously affected economic productivity, including decrease in *Palla* fish breeding and catch, riverine forest products, and loss of wildlife species, agriculture and marine fish species. If the process continues, many more forest, fish, bird and wildlife species may vanish soon. This will exacerbate the already dismal situation further increasing poverty and decreasing future development potential for the people who depend entirely on these resources.

Fourth, the drainage project of Left Bank Outfall Drain (LBOD) in the Badin district has significantly changed the geography of the area. Most importantly, the project has affected coastal wetlands complex, out of which two wetlands are Ramsar sites. According to a World Bank inspection panel report, which investigated the violation of the Bank's policies in financing the LBOD project in 2005, one of these wetlands is biologically dead. The main reason of the destruction is associated with the poor design of the tidal link in the LBOD project, which brought sea water into the wetlands and increased the salinity level.

Fifth, deltaic communities have no access to water and sanitation facilities. This problem stretches from Hawks bay to Ali Bandar in the Badin district. The majority of the fisherfolk who used to live on the banks of freshwater rivers or creeks are among the worst affectees of drinking water crisis. As a result these people pay significantly more than the elite of Pakistan for water services. This is perhaps the worst example of social injustice in our society and has tremendous economic repercussions for these people.

The situation is far from stable even today. The development policy processes that are causing the death of Indus delta are still continuing. There is little realization about this silent human crisis of more than one million people, flora and

fauna of the area and one of the vital ecosystems of Pakistan. Perspective on this human crisis is characterised by officials of WAPDA who consider release of water down stream Kotri barrage as a waste. Similarly, the donors after supporting huge infrastructure projects upstream are still keen to finance mega reservoirs.

Recommendations

- The Government of Pakistan must establish an Indus Delta rehabilitation programme with an independent body to implement it. The plan should envisage the revival of lost species, protection of environment resettlement of people and long term coastal zone management.
- Ensure at least 10 MAF water down stream Kotri barrage immediately till such a time as the precise amount of water is assessed through a detailed study. However, the 10 MAF water release should be continual.
- A comprehensive multi-disciplinary study must be conducted to determine the volume of water required for the protection, preservation and revival of the Indus Delta and blocking sea intrusion.
- The study recommendation must be immediately followed after completion and, if recommended, water flow down stream Kotri be increased.
- The development plan must recognize the communities' rights over all the natural resources.
- Comprehensive assessment of losses must be carried out and communities provided adequate compensation.
- Environmental laws and standards must be adhered to when disposing the urban industrial as well as agriculture waste in coastal waters. The polluter pays principle must be adopted for those who dispose untreated waste into the sea.

- A rapid programme for the provision of social sector services which includes education, health, water supply and sanitation, micro credit must be initiated to diversify sources of income and build long term human capital.
- Physical capital enhancement schemes must be launched, which should include disaster preparedness, essential infrastructure etc.
- Fishing communities must be facilitated for increasing sustainable fish production, which may include construction of jetties, provision of boats on subsidized rates.
- Comprehensive coastal zone management plan must be developed in consultation and with the informed participation of local communities, which must ensure communities rights over land and resources.

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OUR VISION

The vision of The Friends of Indus Forum is:

"Ensuring prosperity for current and future generations in Indus Basin particularly lower riparian through coexistence and harmony with nature".

AIM

To address the multiple factors that have generated diverse threats to natural ecosystems in which the survival of the species is increasingly becoming difficult and in which people who depend on biodiversity and natural resources are pushed to poverty and despair.

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