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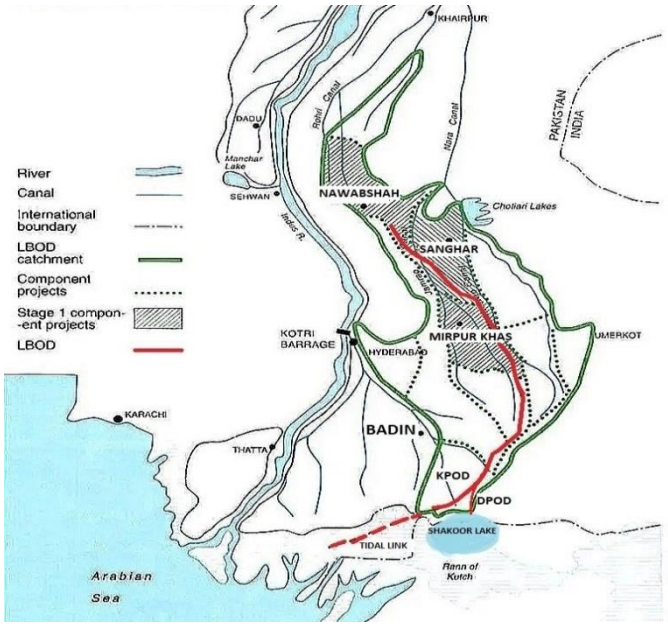
LBOD: Culprit Behind Sindh Floods?



Establishment of industries along the Indus River in Sindh province, led to the discharge of saline effluents into nearby agricultural lands, and fresh water bodies. To address this challenge, concerned authorities devised a drainage system which could dispose the harmful saline effluents and Indus River basin floodwater, along the left bank of the Indus River, into the Arabian Sea. Left Bank Outfall Drain (LBOD) project, that connects districts of Nawabshah, Sanghar, Mirpurkhas and Badin, commenced in 1974, and it was completed in 2002, with the assistance of the World Bank and Asian Development Bank. Furthermore, according to Asian Development Bank's report, it has four major segments, i,e, Spinal Drain, KPOD, DPOD, and Tidal Link, with respective lengths of 210 km, 56 km, 38 km, and 41 km[1]. The LBOD project intended to dispose these saline effluents into the Shakoor Lake. However, it was reported that, India objected to the disposal of wastewater in to the said Lake (80% owned by India), which compelled the authorities to re-route the pathway, to 41 km west of the Shakoor Lake, via tidal link, into the Arabian Sea. Resultantly, these changes defied the natural flow of water, and the forced reversal of water flow during high tides.

According to the Pakistan Meteorological Department, the July 2022 rainfall was estimated to be approximately 177.5 mm, which was more than twice, in comparison to the average 63.1 mm [2]. This led to the accumulation of water in major part of Sindh Province, and the left bank drain (LBOD), became incapable of draining rain water. The districts of Mirpurkhas and Badin, were most affected, as the LBOD was designed to accommodate only 4600 cusecs, whereas, more than 12,000 cusecs of water passed through LBOD, which led to breaches and outbursts [3]. Implying that not only these floods have inflicted major economic losses, but they also posed several national security concerns for state as well. According to an assessment, which examined the aftermath of 2022 Sindh floods, it was found that these breaches and outbursts have not only resulted in an approximate $1.3 billion of economic losses, but also sabotaged about three-fourths of provincial locomotion[1].

LBOD, in its functionality, was designed to maintain water loggings, and to re-route the passage of saline effluents from lower Sindh districts to the Arabian Sea. However, several factors discussed below have contributed to the inefficiency of the structure[4].

Firstly, as water in Pakistan flows from north to south, the drainage is designed accordingly however, at the tail end close to Shakoor lake, a 41km of new structure was created having a direction of east to west, defying the natural flow of water and also neglecting the high velocity coastal winds that could reverse the water flow during high tides or cyclones.

Secondly, according to a 2006 investigation report, the re-routing of the drain from Shakoor Lake to the Arabian Sea implied that the sea water flow was reversed during high tides[5]. Consequently, this led to the spread of saline effluent infused water to all nearby areas, especially Badin, and also effected the precious flora and fauna of the region.

Thirdly, the built quality of the drain, despite international funding, was unexpectedly weak. The built quality of LBOD was testified in 1999 when the Choleri WEIR, next to the Kadhan Pateji Dhand Complex and KPOD was collapsed under increased water loggings [6]. Other than that, there have been many breaches and intrusions at various segments in the spinal drain of LBOD, and especially at the Tidal Link, which connected the KPOD with the sea. Resultantly, the saline effluents caused multiple environmental hazards, such as, the contamination of the nearby water bodies, the degradation of the nearby fertile lands, and it also displaced thousands of local residents as well.

Fourthly, it was found that the net capacity of the drain was not constructed as per flood sustainment requirements. In 2011 alone, it was found that the total capacity of the LBOD was 4600 cusecs, while the rain discharge was approximately 14000 cusecs [7]. This implies that if one would keep in consideration of the 177.5 mm of rainfall during July 2022, the discharge rate would have been slightly above than twice of the average discharge rate, causing an unprecedented levels of damage.

The net effect is, that despite completion of monsoon period of 2002, most of the land is still having standing water in the fields and is not possible for the farmers to sow their wheat crops this year. Besides, it is found that in Sindh alone, floods have destroyed 3.5 million acres of crops, and saline infusion, which estimates up to 78% of the total agricultural loss during the 2022 monsoon floods. Furthermore, the saline infused floodwater has a high tendency to affect the fertility of lands, implying that the areas which have witnessed the outbursts of LBOD, may become infertile and food insecure when the water dries.

LBOD was illogically designed, along with a minimal capacity for water flow, which can have major repercussions for Pakistan's economy in the near future.

Additionally, it was estimated that approximately 12.5 million people around the Indus River strip have been left homeless due to the 2022 monsoon floods. Lastly, according to the 2011 Annual Flood Report, there were numerous suggestions for LBODs remodeling and re-design, but no actions were taken to address the recommendations made.

Following recommendations can help resolve these issues:

- The concerned authorities need to stress on the lending agencies for remodeling and redesigning the discharge capacity of LBOD to a bare minimum of 18000 cusecs.
- There is a dire need of remodeling weirs, and enhancing the size of drain inlets. Other than that, there is a need to reset the natural flow of LBOD back to Shakoor Lake, which implies that Pakistan will have to pursue Indian permission or design a new drain from north to south in Badin district, in order to finally drain out the water with natural flow into the sea.
- The concerned authorities must ensure the constructional resilience of the drains in order to sustain a continuous disposal of waste and rainwater. Authorities need to emphasize their concern for the built quality of these drains, as the construction quality would be as important as the design itself.

The LBOD was poorly designed in terms of water flow, water capacity, and even in terms of construction quality. Consequently, a large scale of livestock has been wasted due to 2022 floods in Sindh. Other than that, waste water has reached new extents of land this year, implying that more piece of land has been degraded this year. It is foreseen that if the current rain pattern continues, and the drainage system, as mentioned above, is not improved, then Sindh may experience a similar or worse catastrophe in the coming years.

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