THE LARGE DAMS – THEIR DISADVANTAGES AND OBJECTIONS TO THEIR CONSTRUCTION BY AID GIVING AGENCIES

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Most dams were constructed in the last century for power generation in temperate zone countries and both power and in irrigation in various arid countries. Small dams were constructed at end of 19th century in Europe and Northern America, where demand for power by the industries had become almost unquenchable. Early dams up to 1950 were small because earth moving machinery like bulldozers, scrappers, drag-lines, front-end-loaders, dumpers, pile and sheet hammers, heavy cranes and large concrete mixtures were unavailable and were waiting for portable diesel engines to empower them. These developments started in the first quarter of the last century and an early peak of this technology had already reached in late 30s but the World War-II delayed its development. Only a few large dams belong to the pre-wars era of 1910-1950. There were further improvements in construction and earth-moving machinery immediately in the post World War-II period. This saw a boom in construction of the dams the world over. The industrial countries were not only interested in selling their equipment but also their technologies through their contractors and consultants to the developing countries and almost every highly developed country contributed funds for the construction of dams. Very large finances were advanced which mostly returned to developed countries through their sale of equipment, fee of consultants and contractors.

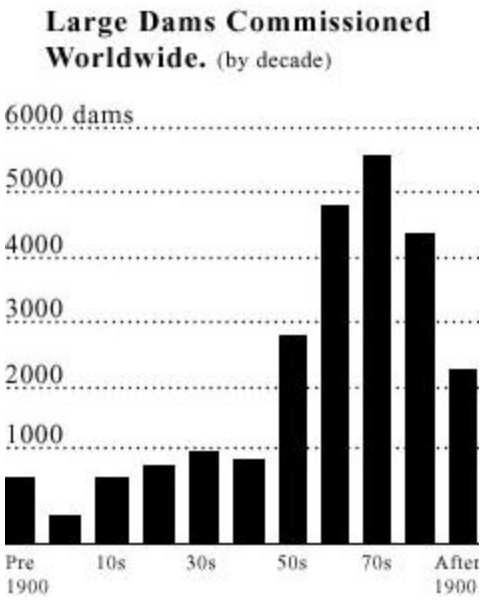
One factor was ignored: the effect of large dams on environment. The early scene of deterioration of environment was noted in increase of salinity, in the Aral Lake in USSR. The river discharges into this lake were reduced as their waters were diverted by a series of dams and barrages (which are in a way small dam). The Aral Lake's environmental deterioration did much damage, nullifying the gains which accrued in the form of more land being brought under cultivation in the Central Asian desert lands. These projects were started in 1920s and had continued up to 1980s, irrigating some 80 million acres of land, but soon it was realized that irrigation had caused water logging due to rise of water table and salinity of the soil, due to salt brought on to the surface by capillary action. To over-come the problem, drainage works were introduced and surface salts found their way back to the Aral lake, which became saline, fish disappeared, many thousand people were dislocated, towns and ports deserted and trade and tourism dwindled. This is just one example, which reflects on all dams, barrages

and irrigation schemes, which make intensive use of water resources and land contributing to an increase in the population on lands irrigated by dams on the one hand and in setting in motion migration of population from different areas on the other. No care was taken of biodiversity and almost all floras from the large tracts to be irrigated were removed and so were the fauna depending upon them. New methods of cultivation, opening up the area, metal led and earthen roads and interception of natural drainage, leads to erosion by wind and water. The concentration of the agriculture was on a few species and the greed to get most out of land and water resources, led to the method used, which were unsuitable in the long run and uneconomical. They needed more and more inputs to get yields form exhausted soils, which ultimately led to unproductiveness. This applies to all the dams and barrages.

Today there are 800,000 dams world wise, out of which 45,000 are large dams with heights of more than 50 feet or having reservoir volumes of more than 100 million cubic feet. They are the most damaging. All dams get filled with boulders, gravels, sand and silt. Most of them have life expectancy not more than 40 years and some even half of this. A dam like Tarbela having capacity of 7.3 million acre-feet will accumulate 20 billion tons of silt in what is called live or drainable capacity and probably 50% more in pond area in its lifetime and then it is to be abandoned. A dam can not be left on it own to breach its walls and discharge silt. If blasted and allowed to discharge silt by water coming from up-streams, this silt would accumulate at the bed of the river down stream, raise its level, possibly change its course or breach barrages enroot to the sea. The dams have therefore to be breached in a controlled manner to discharge its silt down streams in the river, over a period of 10-12 years and at a substantial control and cost and yet it is not sure, what would be the impact because some of the boulders can reach the bed of the river when velocity of water is high and when velocity becomes low, boulders will trap silt and sand and rise the level of river bed, with undesirable consequences.

Rate of Commissioning New Dams decade wise in Last Century:

Large dams are categorized as more than 50 feet high and 100 million cubic feet live storage. Such dams were a few before 1950 as heavy equipment to construct them was waiting to be developed. World War-II (1939-1945) had further slowed their development. Europe has a few large dams but a large number of small dams. Large number of small power dams in Europe has helped in regulating water supplies to the rivers, which are also used for boat traffic to handle goods at very low prices. The



Number of new large dams constructed reached its peak by 70% and has slowed down since then to less than 40% as shown in the graph.

Current Distribution of Large Dams in the World:

S. No	Country	Discharge
1.	China.	45%
2.	USA.	14%
3.	India.	9%
4.	Japan.	6%
5.	Spain.	3%
6.	South Korea.	2%
7.	Canada.	2%
8.	Turkey.	1%
9.	Brazil.	1%
10.	France.	1%
11.	Others.	16%

However though large dams still persist, but all aid giving agencies have cut down funding of them. In 1994 World Bank loaned $1,438 millions for their construction and 5 years later in 1999 it was reduced to $591 millions.

World commission on Dams has discouraged construction of new dams mainly on account of high cost, displacement of people and environmental effects on the riparian.

Environmental Effects of Tarbela in Sindh:

- The total riverain area between the Flood Protective Embankments from Kashmore to the sea is about 23.7 hundred thousand acres of which 7 hundred thousand acres form the river channels and the rest 16.5 hundred thousand acres were agriculture and forest lands. Forest land was less than 5 hundred thousand acres making 11.5 hundred thousand acres as agriculture land. This land along with forest land was flooded each year up to 1973 before commissioning of Tarbela. During, the inundation season and on receding of the flood waters in October, bumber crops of oil seed, vegetables, melon, cucumber species, wheat, oats, etc., were raised in winter and harvest completed by April. In May and June, the land was fallow and again flooded from July to October. Forest besides wood as timber and fuel, also provided grazing ground for hundreds of thousands of cows, buffaloes, sheep and goat. River provided enormous quantity of fish. At the delta were the mangroves spread over 600,000 acres. The employment opportunities in riverain area attracted people from adjoining lands. Today the forests have disappeared, mangroves have shrunk to 45,000 acres, fishing in the riverain area has dwindled to less than 10%. Indus dolphin has almost disappeared, land fauna like deer no more exists, and many wild mammals have disappeared. Presently the area is dry almost 10 months of the year leading to wind erosion followed by water erosion when it comes and the process decrease fertility of soil. The agriculture in the riverain area including forest land was supporting one person per acre and some 16 hundred thousand people have been displaced and have migrated.

- In the last 60 miles of the river channel, sea tides reach every day and saline sea water has seeped into adjoining lands, turning ground water saline and also increasing salinity of the soil. People in Shah Bunder, Jati, Karo Chan and Ghora Bari Talukas have migrated. A town like Keti Bunder having population of 25,000 in 1973 has only 5,000 souls left. The animal husbandry and agriculture in these Talukas has deteriorated causing un-employment, poverty, desensitization and migration in environment unknown to people.

- Lack of water discharging to the sea has increased salinity of sea water along the cost. Prawns, lobsters, crabs and palla or hilsa fish which spend some time in brackish water have reduced considerably. Mangroves also

had supported large population on fodder, timber and fruit from them. This population has also migrated away from the area.

- Salinity of sea water near the coast has increased.

- When the river was in full spate in early 20th century, the land advanced into the sea at the rate of one mile of century. It is enough to say that at the time of Alexander's conquest of Sindh in 325 BC, the coastal line was near Gharo, Gujjo, Pir Patho, Ubhan Shah and possibly Talhar. It has advanced for more than 30 miles into the sea. As river water is no longer flowing to the sea, reverse action is taking place. Sea tides are eroding the coast, creeks' mouth is widening and coastal bays are narrowing. It is anticipated that within 500 years the sea would be where it was 2,325 years ago.

This is an end of an era, which started during Holocene. The mighty Indus is in chains of the man strong enough not to let it flow freely which in turn has caused irreparable loss to the man.