the daily observer
We stand for people's rights

Date: 31/03/2021 (Page: 38)

DELTA PLAN 2100:

Preventing flood and erosion- conserving river water

A S M MASUDUZZAMAN

The Ganges are carrying highest amount of suspended sediment load- formed the greatest delta of the world. The most part of the flood plains are low flat. Many rivers, including the Padma, Jamuna and Teesta come from India - flow across the flood plains. The rivers are fed by heavy rainfall over Bangladesh, northeast India, Nepal, Bhutan and Tibet- begin to flood the active floodplains.

At present- monsoon flood and dry season irrigation water crisis are much pronounced in the Padma-Jamuna-Teesta flood plains due to global warming. The Honorable Prime Minister Sheikh Hasina mentioned that "Bangladesh would not have to seek water from others, if river water could be preserved properly". The 'Delta Plan 2100' proposed strategies for flood control and water retention that might help Bangladesh to leave from Least Developed Countries (LDC).

The Ganges with 2510 kmlength and watershedsof about 1 million km2 - flow across India and enters Bangladesh at Rajshahi. Then, the Ganges merged with the Jamuna (Brahmaputra called Jamunain Bangladesh) near Goalundo and forming a spectacular river flow. These floodplains in Sirajganj, Pabna, Tangail, Manikganj, Rajbari, Faridpur, Madaripurand Shariatpur; as well Tista flood plains in Rangpur- kurigram have deeper flooding than other parts of the countries.

The flood plains are low and prone to flood. The monsoon in Eastern Himalayas has high intensity- Assam catchments area receives highest rainfall of the world. Thus, the Jamuna, Tista and Padma are fed with highest water discharge. Now-a-days, deterioration of the Himalayas watersheds has been occurring at a high rate. Thus, higher rate of sedimentation are changing hydrological behavior of our rivers and causing greater flood from over-bank spills.

Due to diversion of water by India from the Padma and Teesta - we have serious dry season water shortage; but, during monsoon- large quantities of rejected floodwater come across border. India has constructed barrage at the Farakka and Teesta without improved water control. Below the up-stream of Farakka and Teesta- there is increased flow during monsoon. If flood peak of all rivers coincides- that intensify flood.

Sediment load of about 1700 t/km2/year for the Ganges and 1570 t/km2/year for the Bramaputra is one of the world's highest. Bangladesh, the largest delta of the world - built up of accumulated sediments. Large amounts of sediments - contribute to form chars within river systems. Many chars still in formation and reclamation of large char land are possible.

The sediments bought from upstream - raising the Padma, Jamuna and Teesta rivers beds and forming new char in the rivers. Thus, the river beds are rising, losing their water holding capacity and silted Padma, Jamuna and Teesta have lost their flow. They have become narrow having many char lands and cannot hold enough water during monsoon, which is an important cause of flooding and erosion.

Many cultivated areas in river side are breaking in the face of erosion. Many char lands are not good for balanced river flow. In wet season, char lands in one side of congested river- prevent most of water from draining away.Thus, high flow of flood water from congested char land site- hit other side of river and serious bank erosion occur. Attempts made to remove char lands and protect erosion are not adequate.

Huge discharges of Himalayan streams cause extensive loss of crops and lives. Landless farmers suffer from hunger, if crop is damaged. There are little adoption of semi-dwarf modern rice varieties in flooded areas. Only dry season mustard-late boro are grown - flooded areas remain fallow during wet season or local tall Deep water rice varieties are grown.

Bangladesh Water Development Board (BWDB) has constructed hundreds of kilometers embankments in the bank of Padma, Jamuna and Teesta. In many areas- poorly planned embankments block natural drainage. Erosion control and dredging of rivers are not adequate-loss of lands-resources by erosion are common. For breaking of valuable agricultural lands - many people are becoming homeless and helpless.

SEE PAGE 38

the daily observer
We stand for people's rights

Date: 31/03/2021 (Page: 38)

FROM PAGE 37

We were not able to make full flood control over our rivers and to utilize river water for irrigation.The huge amount of river water go un-used into sea. Teesta barrage and G.K project were not fully succeeded. Underground water is used for dry season irrigation. However, Delta plan 2100 give us guide lines- how to control flood and erosion, as well- how to facilitate dry season surface irrigation.

Land erosion is common phenomena. River training and embankment/dike on river bank could be designed to provide high level of protection. Research could be done on enhancing strength of embankment/dike/dam by placing rocks/stones on the river side. Feasibility studies on flood water depth, erosion and surface water utilization process are needed.

A mega project "Preventing flood and river bank erosion" could be taken having several sub-projects: 1. Protecting selected river site and ferry ghats from erosion using concrete structures and stones 2. Dredging of rivers and removing land mass; river training for balanced flow, navigation and erosion control 3. Re-using dredged material for constructing embankment and for land reclamation 4. Limited control of flood in beel areas for indigenous fishes 5. Fully flood protection for multipurpose land use for industry and for intensify cropping.

Another mega project " Conserving flood water " could be implemented having several sub-projects: 1. Fresh water reservoir in river side beel areas without barrage with irrigation network- emphasizing eco-tourism, 2. Improved connectivity by embankments/roads and culverts with drainage; as well better navigation between three main rivers by boats, ships and ferry with modern ferry ghat 3. National water policy -emphasizing regional cooperation on sharing the water of common rivers. 4. Land development and human settlement, alternate employment, better infrastructure in river sites, industrial zone, and modernization of agriculture, live-stock and fisheries.

The flood plains of the Padma, Jamuna and Teesta are fertile; there is scope for flood control with surface irrigation development; as well use of land for crops, fisheries and livestock's and industrial zones. Under Delta Plan 2100- systemic control of flood will secure our crops; will play role to the food supply and to boom-up economy of our country- that might help the country to leave from LDC category successfully by 2024.

The Padma-Jamuna-Teesta flood plains have potentiality for increasing productivity through managing the flood. We are not able to make full flood control and to utilize large scale river water for irrigation. Teesta barrage and G.K project were not fully utilized due to lack of flow in dry season- although large amount of river water go un-used into sea during wet season. Land erosion is common phenomena.

The basic thinking is to develop fully flood protection. The embankment will secure protected areas. Formulation of a project is essential for constructing river bank embankment, river dredging and protecting erosion. 'The Delta Plan 2100' give us guide lines- how to control flood, as well- how to facilitate surface water irrigation.

A mega project "preventing flood and river bank erosion" have been proposed having several sub-projects: dredging and river training, protecting river erosion, limited and fully flood protection. We have to take serious program to excavate silted rivers to control flood as well as to increase river flow in dry months.

Dredging of rivers and removing land mass are needed for deepening navigable waterways and to increase depth of flow- which become silted. Suction dredger suck drudge maters/clay/sands-slurry of dredging is pumped into pipes to deposit on nearby land. Those drudge materials could be re-use for reclaiming land or constructing embankments/reservoirs.

River training and removal of land-mass are needed for balanced flow of river in both sides. The guide banks are constructed parallel to the direction of flow. The guide banks guide the river flow to pass a bridge without damaging its approaches. River training and strong embankment/dike could be designed to provide high level of protection.

The embankments are made through surround flooded areas to restrict over flow of river- keeping rain water out using drainage/sluices. In some cases, poor design brings lower levels of protection. For higher flow loadings- more robust structures are required. The embankments made with a core of sand-covered by a thick layer of clay provide more resistance against erosion.

During dry season, water scarcity is a constrain, mainly in 'Barind areas' due to adverse effects of Farrakka. Ground water table is lowering for over sinking of underground water for Boro rice. Delta Plan 2100' give us a guide lines- how to preserve river water. Feasibility studies in flood plains could be useful for selecting best locations for reservoir. For surface water irrigation- excavation of rivers and construction of reservoirs are essential.

The Farrakka barrage converted dry season flow of the Ganges. Tista barrage and G.K project were not succeeded due to lack of dry season flow. The reality of more water from India could not be confirmed. However, large quantities of flood water come across border during monsoon and go un-used into the sea. Those flood water could be stored for dry season.

There are no alternate but construction of reservoir and excavation of major rivers to storage flood water and to irrigate until end of dry season. Construction of large reservoir with dams may create some environmental problems. Reservoir failures can generate huge increases in flow in a river - may wash away towns and villages. So, careful planning is needed.

An ambitious project is to constrict a reservoir across the Padma to absolve and conserve flood water. Flood control reservoir could collect water during high rainfall, then again could release water slowly. The reservoir stored water could be used for dry season irrigation connecting with many irrigation channels, industrial use, fisheries and navigability. Water may also be used to maintain river flows for downstream uses.

There is a challenge towards construction of 'the Padma barrage' in the face of environmental issues, as well withdrawal of water at Farakka. 'Delta plan 2100' might provide an approach for effective regional cooperation - regarding fruitful solutions on water sharing of the Padma, Tista and all other trans-boundary rivers.

An 'alternative water conservation' approach found feasible over traditional barrage. Construction of 'reservoir' in beel areas adjacent to the river without diverting river flow by barrage- is an innovation. The natural depressed reservoir areas are separated by building surrounding dam (wall of reservoir). No barrage is constructed- it will not create major environmental problems, as like barrage.

An innovative idea is to 'construct a reservoir in Chalan beels'- so that water is available in reservoir for irrigation and fish culture during wet and dry months. The low-lying 'Chalan Beel' is connected with the Padma having huge water during monsoon- at a portion of 'Chalan Beel' - a reservoir with series of sluices could be formed without barrage in the Padma.

The best reservoir sites could be selected in the Padma and Jamuna flood plains. Four sites has been proposed: a. Chalan beel near Rajshahi, b. Bahadurabad ghat near Jamalpur , c. Two rivers connection point, Goalando, Rajbari, d. Near the Padma, Madaripur. Further, in many low-lying areas through flood acceptance (no flood protection, but dredging)- fish and duck culture could be expended.

A mega project "Preventing flood and river bank erosion" have been proposed to excavate silted the Padma, Tista and Jamuna to increase their flow in dry month's as well as to control flood. Another mega project "Conserving water in reservoir " could be implemented emphasizing flood water conservation, eco-tourism, recreational uses of reservoirs, improve river sites infrastructure, better navigation. National water policy could emphasize regional cooperation on sharing water of common rivers.

If provided with irrigation facilities through reservoir - double and triple-cropped rice areas will be increased; reservoir could increase fish productivity. With our success in flood control- productivity of flooded areas will be double through land development, multi-purposes use of land in agriculture, live-stock, fisheries and industrial zones. 'The Delta Plan 2100' could maintain higher economic growth and could fulfill the requirements to leave from the least developed country (LDC) category by 2024.

The writer is a Chief Scientific Officer, Bangladesh Rice Research Institute (BRRI)