

## Living with Floods

### People's Perspective

*Modern flood control technologies have neither been very successful nor are they people-friendly. This is because their focus is on trying to control the waters of rivers in spate and not of making use of the flood waters in the best possible way, while ensuring the least damage. This forms the basis of flood 'management' traditionally in many villages in Bihar, West Bengal and Bangladesh.*

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The entire debate on the flood ends with the words that people should live with floods. This is interpreted by different interest groups in the different ways. To a politician or most of engineers this phrase is an object of ridicule as they think that the proponents of the idea are fatalists who have accepted defeat against nature.

We know the limitation of modern flood control technology and that the engineers, when they talk about living with floods, flood management instead of flood control, or the flood plain zoning as the possible solution to the problem of floods, are under compulsion to write those prescriptions. The interesting thing is that they simultaneously talk about big dams as a permanent solution to the problem of floods. They maintain that the proposed Kosi High Dam, for example, will solve all the flood problem of north Bihar and that there is no alternative to this dam. They hold similar views about the proposed Pancheshwar, Karnali, Subansiri, Dihang and the Tipaimukh dams. These are the solutions that can be spelt out in two or three words. To a person who understands the limitations of technology and is not amused by the slogans, things are different. However on the Kosi High Dam negotiations are going on for past 53 years with Nepal. Nepal has its own priorities. Whenever India has taken up the issue of construction of dams in Nepal in past, it has put a condition of providing it with an alternative trade route on India's western coast. India, obviously, do not agree to this proposal because it has already given Nepal a trade route on its

eastern coast. This is where the talks break. India agreed to give Nepal a trade route during the visit of Nepalese prime minister, Manmohan Adhikari, to India and, in return, got the permission to study some dams proposed to be constructed in Nepal. It took them over 45 years to sort out this small difference. The water and power rates, together with the benefits of flood control, are yet to be resolved. Under the circumstances floods have to be tackled at the local level and people's science and technology will be the major tool.

There is an incident in the Mahabharata where the patriarch Bhishma, lying on a bed of arrows, awaiting his death, gives sermons to Pandavas every evening on the various aspects of governance. Once Yudhishtir asked him about different kinds of treaties that a king could enter into with other kings. While defining kinds of treaties, Bhishma narrates this story of the ocean and his wives, the rivers. Once the ocean called all his wives and said, "Rivers! I notice that during floods you get filled to the brim and uproot big trees and carry them with their roots and branches to me but the cane is not seen in your flow. The cane is a thin and very insignificant plant. It has no strength of its own and grows all along your banks. Still, you are not able to bring it to me. Do you avoid the plant or has it done some good to you (that you favour it). I want to hear about it (from you) why this plant does not leave your banks and come here."

Ganga replies, "O Lord of rivers! The big trees, because of their arrogance, do not bow before the might of our flow. Because of this confront nature, they get destroyed and have to leave their places but the cane is not like them. The cane

bows before the swift currents and when the river subsides, it regains its place. The cane understands the times and behaves accordingly; it is always in our grip and never misbehaves with us. There are no traces of arrogance in it and that is the reason why it hasn't got to leave its place. The plants, the trees and the creepers which bow before the might of winds and the rivers and raise their heads only when the wind or the river subsides, are never destroyed." Bhishma says "...when a learned king assesses that the opponent is more powerful, he should behave like a cane and must bow before the mighty. There lies wisdom".<sup>1</sup> Bhishma's teaching is one of the first lessons in dealing with the rivers.

The arrogance of scientists and engineers in controlling the nature has created more problems than solved them. We keep hearing about 'flood-resistant houses', 'flood-resistant crops' and 'flood-proofing' and so on. Why cannot we have flood-tolerant houses and flood-tolerant crops. Why don't we think of converting the flood water into a resource instead of dealing with it as a problem?

### Case of Partapur

On the bank of Balan River in Jhanjharpur block of the Madhubani district, in Bihar, there used to be a village called Partapur. The village had one major and three small tanks in it. The bigger tank was located at a higher elevation and linked to the river by a drain. The entry point of the drain near the river was blocked by mud. As the water level of the Balan used to rise during the rains, the villagers would open the drain and the river water would gush towards the main tank. After the main tank was filled, the river water was led to other smaller tanks through link drains. Once the tanks were filled, the inlet drain was closed again only to be opened the following year.

These tanks were used for providing supplementary irrigation to pulse and the oil seed crop, grow fishes, and meet the daily needs of water. The villagers had their own traditional variety of paddy seeds that would tolerate submergence up to 1.2 to 1.6 meters depth of water. The river being free to spill, the Balan waters would never rise beyond this height. Thus one gets paddy, plenty of fish in the tanks and the river, pulses and the oil seeds. Their

wells would never dry and they had enough time to relax. No wonder that the floods in the Balan were eagerly awaited.

If, in any season, the flood waters rose extraordinarily, the villagers would move to safer heights within the village. They would come back to their houses once the river subsided, thus dealing with it on equal terms. This system of dealing with floods and irrigation was no way less scientific except that there was no aggression against nature and no large schemes were involved. Then whole show was managed by the villagers and was entirely within their own control. Tapping river water from the top layers of the river flow meant that only fine silt, beneficial for the crops, could enter the channel and the coarse sand, flowing in the middle or lower layers of river water being heavy, would not be able to enter the tanks.

Almost all the villages in this part of the country had some arrangement worked out with the river, streams and tanks for irrigation. The Balan was joined with the Kamala in 1954 and the combined course, popularly known as Kamala-Balan, was embanked in early 1960s. Partapur got trapped between these embankments and the villagers deserted it, fanning out in all directions. The census report (1991) lists it as a village with no habitations.

The tanks in the villages in Mithila region were an essential part of life, which were used for rituals, bathing, washing, fisheries, cattle and growing Makhana besides being used for irrigation in the winter season. The villagers cleaned these tanks every year, as a ritual, on the Sankranti day of the month of Vaishakh (roughly in the middle of April). The soil that was dug out annually was used for washing and also as manure in the fields. All these tanks are in a dilapidated condition now as their maintenance and upkeep has slipped into the hands of the government.

Kautilya had written a lot about the tanks, their construction, maintenance and sharing and usage of tank waters in his famous Arthshastra (Dharmasthaniya Tritiya Adhikaran, chapter 9, Vastu Vikraya Prakarana). Tanks had a vital role to play in the economy of south India and detailed records are available about them. Vedvyas, in Mahabharata, talks extensively about the variety of tanks that can hold water till the monsoon, winter, autumn and summer months. Arranging for water for the use of common public was considered as one of the most revered job (Mahabharata, Anushasan Parva, Chapter 58).

R S Sing, sub manager of the Raj Darbhanga had exploited the potential of irrigation through small rivers and nallahs,

in the winter season, in the later part of the 19th century. People used to throw small bundhs across these nallahs or even rivers like Kamala and raise the water level upstream and push the water into the abandoned channels of the rivers or the canals and take the water to long distance through small channels and that they called 'pynes'. The discharge in the river used to be low (around 18 to 26 cumecs) in that season and was well within the means of the farmers to handle. King had successfully tackled many famines in the area with very small inputs [Darbhanga Raj 1902].

Similar was the practice in the Kosi belt also. The untamed Kosi used to flow in various channels that spread over a vast area. There was a flood moderation of sorts because the river water could spread over a large area. These small channels like the Dhemura, and the Goraho, the Harisankhi, the Lagunia and the Tiljuga, etc were bunded during the winter season and water taken to fields for irrigation. The problem lay in the areas that were subject to deep sand casting and erosion, but there used to be some social security. The neighbouring villages/families used to help the flood victims by offering their lands to them, on a temporary basis, for building houses and cultivation. This was not because of any mercy shown to the victims but out of consideration that, some time in future, they also might get hit by the river and need a helping hand. Such gestures are not seen anymore. Thousands of the people are rendered homeless and landless every year due to erosion of the rivers and we do not have a policy to rehabilitate them.

### **Burdwan – Granary of East**

Willcocks (1930) reported about the Damodar river floods and the irrigation system that the farmers in the Burdwan district of West Bengal had been following. The farmers used to construct low height bundhs, one meter or so in height, along the river. With the onset of the monsoon, the rainwater used to collect in their fields where they could sow the paddy seeds. By the time the seedlings were ready for transplantation, the river also used to rise with the advancement of monsoon and transplantation used to take place. And then the villagers would resort to a large scale and simultaneous breaching of the embankments. The river water would come gushing into the paddy fields. Just because the bundhs were of low height, it was only the top of the layer water that came into the fields and this was a very rich soil

nutrient. Along with the floodwaters, eggs of fishes would travel to all the places wherever the river water could go and would soon become small fingerlings, which were carnivorous in nature and would finish off any larvae of the mosquitoes that are bred in the stagnating water of the countryside. The river would spill over five to six times during the monsoon season and would irrigate the fields along with the nutrients that comes with its waters. The paddy and the fishes would grow together and if there was a dry spell, the villages in the West Bengal had a series of ponds, one in every house, where the fishes could take refuge and the water could be used for the irrigation in emergencies. After the rains were over, the people used to replace the bundhs on the Damodar. The retained moisture in the fields was enough for the cultivation of the pulses and the oil seeds. No wonder, Burdwan was one of the richest agriculture areas of the country.

The British understood the people's wisdom but only after destroying it. They banked the Damodar with strong and sturdy embankments to prevent its spill, while the strategy lay in spreading this water making the fullest use of its availability. Comments Willcocks, "...No villager could have given such a sound engineering opinion unless they had heard their fathers talk of such things, or had themselves seen the banks being cut. It explains the 40 to 50 breaches in single year in the Damodar river banks" [Willcocks 1930]. Since the people used to affect 40 to 50 cuts simultaneously in the river embankments, the floods could never become a problem. The British thought in the beginning, that breaching the embankments was the handiwork of the 'anti-social elements'.

The drainage pattern of the flood plains has been ruined because of the construction of the embankments and thoughtless extension of the roads, railway lines, canals without reasonable provision of drainage. The village roads built under the Jawahar Rozgar Yojana have brought floods from the periphery of the village to the doorsteps of the household as there is virtually, no provision of drainage through them. The road-builders are not even aware that there should be some arrangement for drainage through these roads. A careful study of the traditional practices is the need of the hour.

The study would reveal the living pattern and the coping mechanism of people in the flooded areas, people's strategies of facing the floods. This is particularly important because we are still looking at our problems through the European or American eye.

As the situation stands today, the flood water stays for a longer period in the countryside and it easily takes the month of November to get the fields dried and start sowing operation for the rabi crop. With the snow melt in the Himalayas, by the end of May, many rivers start getting water into them and this water sometimes spreads into the countryside. News about floods in Assam and north-east start pouring in by the month of May. It will be ideal to develop crops that could be harvested during this period and their water requirement should normally be met from the moisture content of the soil since irrigation in the most of flooded areas either does not exist or is very costly.

In some parts of the north Bihar, people resort to multiple cropping as they sow green gram, maize and paddy simultaneously in the month of February/March. Paddy is at risk in case of early floods but the other two crops are harvested before the rains. The farmer never returns empty handed to his home. Some attempts have been made in Bihar and eastern Uttar Pradesh to cultivate rabi crops in 'chaurs' in the areas to which the accumulated water recedes at the time most suited for sowing, with positive results. Some experiments with new variety of paddy in the rabi season (like Gautam) have yielded good results. There is a need to consolidate these efforts [Saran 1998].

In case of repeated floods, the paddy seedlings get drowned and spoilt. It takes about three weeks to sow the seeds again and rear them to transplantation level. This delay has its impact on the output. In Bangladesh, the farmers are reported to prepare emergency seed beds on the floating bamboo platform and anchor them to some strong object. In case transplanted paddy is drowned, re-plantation becomes easy with the use of floating seedbeds [ADAB 1998]. There is good scope for crops grown over sand-cast lands like water melons, cucumbers, etc. Traditional growers of these crops can help in such ventures.

Let us take a look into the traditional housing in the flooded areas. Bamboo, wood, thatch, paddy straw, various kinds of weeds, palm tree-leaves and stems, and coconut leaves become the basic building materials in the flood-prone areas. Some times the walls and roofs are plastered with mud which has to be replaced after the rainy season is over, if the house has been subjected to running water.

Bamboo is a wonderful building material. Whenever a village is trapped within floods or is exposed to breaches, almost the entire village is wiped out but the bamboo remains intact to narrate the tale

of destruction there. People in north-east have made use of bamboo in an admirable way in the construction of floors, roofs and walls. They have used bamboo as stilts to support the house. Small floods pass under the floor of the structures without causing any damage. Lofts, within the homes, provide space for storing essentials that includes fodder and fuel. Bamboo floors are plastered with mud and that is how the space for cooking is carved out within the home. Goats and piglets are kept in the verandas of the houses. Just because the floor is made of bamboo matting, spraying of small quantity of water clears the entire dirt from the floor. All the important papers are carefully preserved by the people in the bamboo itself and a cap is securely placed on the top. No wonder, Kautilya, in his Arthshashtra, suggested that floods can be tackled with the help of bamboo and boats.

### **Bamboo Cultivation**

Bamboo cultivation should be encouraged wherever possible in the flood-prone areas. Not only does it prevent damage to the human settlements, it comes to the people's rescue after the floods in constructing the houses. Any other tree, which can withstand prolonged submergence, would be useful in the flooded areas because the wood is any way needed for fuel.

Some raised ground within or near the village will be of great use for the people and the cattle to move under emergencies. Such raised grounds was customary in the north-east and is also seen in Bangladesh, known locally as 'killah'. Embankments along the rivers are replacing these structures very fast. Following the 1987 floods, in Bihar, the government had announced that it would build such raised mounds in the villages but it is a promise forgotten. In the Kaziranga National Park, in Assam, the Indian army has constructed raised platforms and elephants and rhinos take shelter on them. This is a commendable step and should be extended to other flood-prone areas also for the benefit of cattle.

In the stilted houses of north-east, provision of latrines is made on the raised floor and the pigs are kept on the ground floor to do the scavenging part of it. In some Assamese houses floating latrines made of braced banana stems are tied to one corner of the house. A hole of 10 to 12 centimetre diameter is cut in this platform for defecation. As the flood-level rises, so does the floating platform. Jute sacks or polythene bags are used to provide for the enclosure in such latrines. This method for excreta disposal offers some convenience

to the user but, surely, pollutes the water flowing underneath.

People in the perennially flooded area of the north Bihar climb the trees, sit in shallow water or look for some hide out behind the bushes of aquatic weeds to defecate during the floods. One can easily imagine the plight of women under such circumstances because there is hardly any place available where they can get some place of privacy. Sometimes, the flood victims take shelter on high ground; be it the embankment, the road, the railway line, a raised ground or a hillock or any such place and it takes little time to get the place filthy. If latrines could be devised at a short notice at these points, it will be a great relief, at least, to the women coming to the camps. Terra-cotta squatting pans are made by some organisations in Orissa and Maharashtra. These are cheap to make and affordable and can be manufactured locally and put to immediate use. Such toilets can take care of the privacy part of the sanitation system.

With the knowledge that is available today about safe disposal of the human excreta, it is impossible not to pollute the surface or the groundwater in flooded or waterlogged conditions at very low and affordable costs. Even if excreta disposal is made effective at certain locations, little can be done to prevent the drains and the dead bodies from polluting the water in the river basins in floods.

Pollution of the drinking water sources is a major problem in the flooded area. Wells have become obsolete, hand pumps get submerged and the flood waters, which most people are compelled to consume, is highly polluted. Chemical dosing of water cannot be organised on the scale that is needed, it involves money and needs imparting education to the flood victims about the methods and quantity of dosing. Boiling of water is ruled out because fuel is scarce.

Most floods are accompanied with rain-water which is safest to drink. Can engineers devise some cheaper method of collecting rainwater in such places for the consumption of the flood victims? Oil tins or the troughs for animal feed are the items that immediately come to mind for storing such water. Polythene sheets can be tied to the roofs of two houses and the collected water can be led to some container. These sheets are common relief material. If this can be done, all that one has to do is to tell people to use the water stored, thus. This can be done easily if the people know in advance where they will move in case of emergency. Once the people have seen the methods of collecting rainwater and

the need for it, the rest is easy. If there is safe water to drink, most of the post-flood ailments are automatically taken care of.

It sounds incredible to think of Rajasthan in case of floods although the state has experienced severe floods in 1996 and 1997. The people there are well versed in harvesting rainwater for domestic consumption round the year. Their expertise in collecting rainwater can be used in flood-prone areas too, with suitable modifications.

A good thing about the floods in our country is that its period is almost defined. Can we have our annual holidays of schools, colleges and all other educational institutions during this period? The students of the medical and veterinary colleges can be deployed in the flooded areas for treating minor ailments and given some credit for their involvement. This is a practice in Assam and some other states where the flood victims do get the medical assistance at the time of their need. In the areas where floods continue over a longer period, floating postal and banking services can be provided to the affected people by rotation through boats. Floating banking services were, in fact, been provided until recently in the Sunderbans.

Cattle are often ignored in any planning for meeting floods and it needs extra care in meeting their demands. Fodder and medicine for cattle is an important emergency input. Surviving on inedible things and standing in water for prolonged duration become their routine.

Modern interventions, in the name of flood control, have disturbed the equilibrium between the rivers and the communities. In good old days the people generally, knew the level to which the river would rise, the duration and the frequency of flooding, the spots to which the family and the cattle would move. In case of natural floods, the people had the time to react while the flood control measures have instilled a false sense of security in the affected population. The situation has become very unpredictable because of the frequent breaches in structures and acute waterlogging.

Natural floods are possible only if the natural drainage mechanisms are not tampered with, which would mean that no obstruction has been put to the flow path of water. This also means that the structures like embankments, roads, railway lines and canals, etc, are not built and the flood plains are not encroached upon. This may not be possible because it is difficult to imagine life without proper means of communication. But it is always possible to provide for the smooth drainage through

these structures and thus give least resistance to the flowing water.

### Controlled Flooding

Controlled flooding resembles, to an extent, the technique of detention basins and, in its refined form, will come very close to the Willcocks's innovations at Burdwan. Should this technique be developed sincerely, the onus of dealing with floods will shift from the technical staff to society, which, in turn, will find its own way to tackle floods. This, probably, is the reason why only those engineers, who have retired from the service, propagate the idea. Wilburn Inglis, former chief engineer of united Bengal (1908), and William Willcocks (1930) attained enlightenment only after they retired and the tradition continues till date. The problem with such people is that when they were in a position to do something, they chose to keep quiet. After all, if anything new or off the track is to be done, it will run the risk of failure or opposition from the status quo lobby.

People, who are breaching the embankments, whether those living inside the embankments, because of rising flood levels or the ones living outside the embankments, because of the prolonged waterlogging, are also doing the same thing – controlled flooding – but are rated 'anti-social elements' by the engineers and the politicians. There is a need to discuss the issue at lengths. One is not sure whether the engineers are aware of the kind and extent of people's education and organisation that would be needed before taking up of controlled flooding. This is an important point because there is virtually no dialogue between the engineers and the people.

If proper drainage facility is not provided, which is what happening at the moment, and if the structures like the embankments are intact, there will be ponding of water. If the structures breach, there is bound to be devastation. One has to choose between devastation and the smooth drainage. Till such time the entire flood policy is reviewed, the following steps can ease the situation.

The first thought that comes to the mind is that breaches in the embankments should not occur and that requires their careful maintenance. This primarily, is the job of the concerned departments. There is a dichotomy here. If the embankments are firm and if we are recommending them to remain firm, the life of the people living within the embankments will be at stake and their lot can improve only if it breaches.

If the embankments breach, then the people outside will suffer. The choice, in fact, is very limited.

It is essential, therefore, that inundation maps of the area are prepared for every possible breach along the embankment length and also for every depth of flooding within the embankments. For the sake of convenience, this mapping can be done at an interval of every three km on the embankment. Thus, if the eastern Kosi embankment is 126 km long, there will be roughly about 40 points for which the inundation maps will have to be prepared. Once this is done, it will be possible to identify the locations, which could act as a flood shelter. The necessary infrastructure may have to be developed here providing all the essential facilities like drinking water, sanitation, food, fodder, fuel and first aid, etc, for the persons and the cattle that are likely to come to these centres. This will prevent panic exodus of people for help. The necessary facilities can be provided at these points. A large number of primary schools, mostly stilted structures, were built in west Bengal following the floods of 1978 and are reportedly put to good use during the floods.

Inundation maps are needed for the communities living within the embankments also. If the embankment is firm and sturdy, the flood levels within the embankment would rise and the people may have to shift to safer places. In fact, a good number of people shift on to the embankments themselves. In that case, adequate arrangement for living should be provided on the embankments.

Further, the breach at any point may induce a chain reaction. The water that comes out of the breach spot, tries to re-enter the embankments at some favourable point downstream and the embankment there prevents the water from entering into it. The embankment will breach here on its own or else, the people living on the countryside of the embankment, will cut it. This happens quite often. It is essential, therefore, to study very carefully the history and sequence of events of failure of any embankment to know the events that may follow. There is a possibility of multiple breaches in the embankments, just as it happens in case of the Kamala every year below Jhanjharpur, in the Madhubani district; or along the Gandak in west Champaran. The Pipra-Piparasi embankment on the western embankment of the Gandak, forming boundary between Bihar and Uttar Pradesh, is one of the most fragile embankments and breaches at slightest pretext. Their combined effect may be even more devastating and this could be

predetermined if the inundation mapping is carried out.

In case of a breach in the embankment, the water from within the embankments recedes very fast and the life there comes to a standstill. Almost all the boats that are away from the main courses of the streams get stuck in mud and communication suffers badly. It is always easier to use a boat than to wade through the mud. In case of a breach, the plight of those living inside the embankments is often forgotten.

However, if the inundation maps could be prepared, there will be less mismanagement in relief administration and the chances of corruption also will reduce. The problem is so vast and widespread that the only institution that comes to the mind is the government, as no other agency has the resources, manpower, information or the expertise to carry out the job. The government's role in coordinating relief operations can hardly be emphasised because not only it possesses the information; it possesses the authority too. The CBOs the NGOs and common people can make use of the information as the inundation maps can be used by anybody. The task may be easier in the states where the panchayati raj institution exists and the participation of such institutions must be ensured in the management of the crisis.

When the flood waters strike without much of prior information then the first thing that a householder has to do is to move his family and the cattle to some safer place and then arrange immediately the essential commodities like food and some roofing cover. Food will be needed immediately and within hours of shifting, protection against rains will have to be ensured because it is not possible to remain in open for a long time.

Outside help reaches rarely in this stage of the calamity because in the given situation inaccessibility works both ways. During the floods of 1987 and 1998 in Bihar, many family members of the flood victims came to visit their dear ones from outside and got stranded at stations like Muzaffarpur, Darbhanga, Khagaria and Katihar and had to return. Beldaur block of Khagaria district could be accessed only in the month of October during the floods of 1987, after a gap of about two months. It is essential, therefore to be prepared to meet any eventuality. This preparation can be effective and sustainable only if it is based on the local resources, ideas and virtues and the lifestyle. This should be an internal arrangement of the society because it is the local people who understand their needs and the resources best. Friends,

relatives and neighbours are the first and the only ones to extend a helping hand at this hour of the crisis and their role is very important at this stage.

Vidur, in Mahabharata, has said that a person should do all the things during the day time so that he gets a good sleep in the night. And one must do all the things during the eight months of the year so as to live peacefully during the four months of the rainy season. To prepare for the rains is not a job of a month or a fortnight; it must run through the year. External agencies that come to the affected areas to extend a helping hand are always in a hurry to teach the communities disaster preparedness/management first and learn anything from them later, if at all. It is rare that somebody has lived with the community during a period starting much before the flood and continued to live with them till everything returns to normal and then talk of the coping mechanism or disaster preparedness.

All these efforts will go to waste, if not supported by a well-built system of warning about the possible flood or a breach. The use of electronic media, the TV and the radio, is of immense importance and loudspeakers have also been used for flashing messages. A number of temples and mosques have loudspeakers installed in them and one can influence the priests or the imams to issue warning in emergencies.

When the flood victims become accessible, lot of interventions is possible. A host of NGOs, with vast experience in dealing with emergencies, come forward to extend a helping hand. Their intervention may range from feeding programme to distribution of clothes, utensils, medicines, fodder and temporary house building materials, health programme, etc. Rehabilitation of village artisans, inputs to restore agriculture and economic rehabilitation of petty traders, supporting fishermen are some of the other packages that such agencies offer to the victims of the disaster.

Then there is the great housing debate – whether or not to intervene in the housing programme as a post-disaster measure. Many agencies take up the housing programme following any disaster and after they leave, the site becomes a museum of a sort of all kinds of building materials, building techniques, housing forms and architectural fantasies. Everything related to a building programme exists there except the occupants.

The most unfortunate part of this continuing relief work is that nobody ever questions as to why one should spend so

much of money every year on relief and whether there is any end to it. Organisations often expand their establishment and perpetuating relief programmes becomes their necessity rather than those of the victims. The net result of this exercise is that the organisations forgo their own ideals and their workers are reduced to mere relief managers. The same thing applies to most of the donor agencies also. It is easier for these organisations to raise passions among their donors by narrating harrowing tales of a disaster and collect contributions relatively easily. It is not very easy for these organisations to raise funds for normal developmental programme or the long-term issues haunting the people.

Relief however, is a political weapon and is a double-edged sword. It is a political weapon because by running relief operations, those who are favourable can be obliged and by not running relief, the opponents can be punished. At the time of elections both these commissions and omissions can be encashed. People become dependant on relief and that alone becomes their aspiration. It suits politicians that the people are dependent on them. It is a double-edged sword because a well managed relief programme postpones the debate about a possible solution much farther and if it is badly managed, it diverts the debate to the discrepancies in distribution of the relief items. The real issues are relegated to background in either case. The debate does not go beyond the polythene sheets, ration, salt, candles and match-boxes, while the engineers strive hard to escape the blame of any flood related accident. Both often succeed because the issue is live only for three months, beyond, which even the flood victims do not want to discuss it anymore, because it is the sustenance, and not the flood that is of immediate interest to them. Unless the flood issue is allowed to come out of the boundaries of salt, candles, and match-boxes or at best, the inquiry committee reports which are rarely made public, no fruitful result can be expected.

Food and shelter are the two major basic needs of the people, which get destroyed during the floods, and chances of producing grains recede till the next crop season. A report of Water Resource Department of Bihar suggests that floods affect 76 per cent of total area of north Bihar. Also, some 87 per cent population of north Bihar makes its living from agriculture (1991 census). Some six million people of north Bihar face the fury of waterlogging on a permanent basis. The situation demands serious and urgent action. The government

has refused to think any further because it believes firmly that the flood problem of downstream can be solved if, and only if, the rivers debauching into the plains from hills are dammed. As expected, these views are shared by majority of the people. If we forget about the dams in Nepal for a while, the proposed dams in the north-east need no negotiations with anybody and yet there is no progress. Nobody knows when these dams will be built. The carrot of dams are, however, dangled before the people.

Have we ever thought what is the amount of money that will be needed to construct a hut of 3m x 4m size that is washed away annually during the floods? Just to retain a thatched roof over the head of a family, an able-bodied person within the family will have to look for employment in some town and all his savings will be spent on keeping this enclosure in place. If the family possesses an acre of the land, then to meet the expenses of the agriculture, another member of the family will have to sleep on the pavements elsewhere. That explains the mass exodus of labour that takes place from north Bihar every year and no amount of relief distribution or disaster management can solve this problem. Do we have the courage of evaluating honestly our water development projects in the wake of their stated objectives, time frame and costs? Curiously enough, such reports are prepared every year by the concerned departments but never made public.

Hallet (1937), when he was the governor of the Bihar, had made suggestions in the Patna Flood Conference about educating the masses about the floods. He, along with the then chief engineer of Bihar, G F Hall, was of the opinion that the solution to the flood problem of the state lay in removing all the impediments in the flow path of floodwater and not constructing embankments along the rivers. This would obstruct the flow. Both of them called it undesirable to control floods and maintained that, "...To continue as at present is merely to pile up a debt which have to be paid, in distress and calamity, at the end."

This awareness campaign has to be preceded by committed action research concerning all the aspect of floods, irrigation and power production. An in-depth study will have to be made into the coping mechanism of the flood victims. Let us take the food habit of the people, for example, in the flood-affected areas. It is an indicator of their coping mechanism. 'Sattu' (ground roasted horse gram) and 'chura' (flattened rice) are popular foods in north Bihar and although many dishes can be made out of these, both are of the

ready-to-eat variety, so useful at the time of floods. The people in these zones are known for making good pickles and know the art of drying and preserving the vegetables for rainy days when vegetables are not available. As for nature, it is so kind to the people that when vegetables are not available during the rainy season, the fishes swim to the houses of the flood victims. Their ways of living with floods are yet to be documented and this alone will unfold the mysteries of the hitherto unheard of flood coping mechanisms.

A dialogue is needed to be taken up at all the possible levels, i e, at the level of the common persons, the village level workers, the engineers, the bureaucrats, and the politicians. Needless to say that it is very difficult to educate the educated. Moreover engineers are slightly on the defensive these days because of all they had said so boldly proposed until a few years ago, does not seem to be working and, at least, the stated objectives of the projects have not been met in most cases.

There is a need to remember that illiteracy rate is very high among the target population and print media loses its meaning with the majority. Some section of the population can be reached through vernacular and only a very small fraction through English. When it comes to educating masses over the issue, all the forms of communication will have to be tapped and that, surely, is a tall order. The time has now come to this job on a priority basis. The initiative should come from the government and there is nothing wrong in telling people that the floods cannot and should be controlled. Should that happen, the governments would not have to take the obligations of rats, foxes and muskrats or the 'anti-social elements' for passing the blame of floods. It will not have to blame Nepal for causing floods in the plains nor will it have to blame the centre for the debacle.

The people are also entitled to know the possible consequences of any project because these are made for them and by their resources. Let the people decide what they want. CBOs and the concerned public can take the message to the masses. If the people take the initiative, there is always an apprehension that the government will take it up as a prestige issue and that would lead to unnecessary confrontations

As regards politicians, unless their tenure improves, not much can be expected of them. At the same time it should not be forgotten that they are the decision-makers and raising their awareness level will benefit the society in the long run.

The concept of living with the floods is yet to develop and no serious work has been done so far in the modern societies. All our efforts should be diverted towards making the floods bearable and attempts should be made to convert the water, which has become a liability, into an asset. Let us decide honestly what is feasible and what is not. It should also be remembered that the engineers design a structure for 25, 50 or a maximum of 100 years cycle and, according to them, the calamity for which the structure has been designed, or even worse than that, might hit tomorrow. That puts a severe restriction on the structural solutions of controlling floods. The design specifications of the structures, as a rule, come for discussion only after the calamity has struck.

The process of 'living with floods' is possible only in a decentralised manner. Says Guru Das Agrawal, "...I would like to say that the government should not be permitted to touch the water resources of the people. It should not have anything to do with irrigation or flood control nor it should be involved in any other kind of water management. The people should manage the water resources directly, through gram panchayat, regional panchayats or, at best, through district panchayats. The government could give technical advise or financial resources, on demand, but the entire responsibility should be with the concerned society' [Agrawal 1997].

We cannot continue with the wrong policies of flood control and expect people to live with it. It also does not help people if we rename 'flood control' as 'flood management' and continue with the old programmes. 'Living with floods' never means leaving the rivers totally to their own devices but it means a bare minimum interference with the working of the nature. Unless a comprehensive and a well thought out approach is adopted for floods, the victims will continue to live, not with floods but the politics of it. **EPW**

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