ENVIRONMENTAL ASPECTS OF FLOOD DISASTERS

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Floods have become almost a regular annual phenomenon with us. Apart from the untold human sufferings and the loss of life, the floods cause an estimated average damage of about Rs.210 crores every year. Ever since the disasterous floods in the early 50s prompted the Union Government to treat floods as a national problem, each successive Five Year Plan has provided a larger financial outlay for flood control measures. As compared to the problem, the results achieved are, however, not very significant and the unabated fury of the floods continues.

Ad-hoc approach to Flood Control

The flood protection measures are being adopted on a piecemeal basis. They are largely dictated by political considerations. Decisions at the Centre and the State levels tend to adopt an ad-hoc approach which negate the development of comprehensive and scientific solutions. As and when an area is hit by floods, human considerations along with political and other pressures mount and temporary measures are taken to deal with the situation. As soon as the flood subsides, the need for adequate and well-conceived long range flood control planning is relegated to a secondary place. Such measures may seem to pacify the public temporarily but they do not, and cannot, provide long range solutions to the containment of floods.

The flood control measures should ideally consist of: Engineering Structures and. a package of measure to protect the Environment.

The engineering structures are usually the embankments and reservoirs. The environmental factors would include :-.

a) Afforestation and soil conservation in the catchment area; and

b) Flood plain zoning and drainage of the command area.

In our present efforts of flood control, the emphasis is usually on the engineering structures so as to confine, retain and channelise the flood waters. The creation of reservoirs no doubt helps to dampen the fury of the floods. However, for reasons of economy, reservoirs are made multipurpose instead of being built exclusively for flood control. The multiple use, introduces the problem of timing i.e., while the flood control measures call for an empty reservoir, irrigation and power generation needs may demand a full reservoir. Since the emptying has to be over a period of time, this causes problems in the case of flash floods.

While launching the Flood Control Programme in 1954, it was envisaged that the embankments will prove to be a short-term measure and the reservoirs a long-term measure for flood control. The fact, however, is that while they do prevent damage during the floods of moderate intensity, they may not provide sufficient protection from floods of exceptional intensity. As such, the engineering structures are neither a permanent nor an adequate solution to the problem of floods. In fact, the mere construction of a reservoir or embankment is something like a fire-fighting operation which lacks a comprehensive perspective.

Environmental Package

A major river valley project, whether multipurpose or for flood control, to be effective in the prevention of floods, must have an integral long range component of soil

conservation and afforestation aimed at :-

i) minimal deforestation coupled with an extensive afforestation so that the soil erosion in the catchment and the upper reaches is minimised; and

ii) adequate drainage works in the command to prevent flooding conditions.

This environmental package of the soil conservation and afforestation measures would help in the moderation of peak flows because these measures result in :-

- longer water retention on the surface for a greater total infilteration giving additional water storage in the soil and underground,

- longer water retention on the surface and sub-surface so that the flood peaks are lowered enabling a greater volume of flood water to evaporate; and

- better control of the erosion and sediment-yield giving improved channel flood capacity and the protection of fertile flood plains.

Bare land has a very low water holding capacity and, therefore, the denudation of forests can be directly responsible for frequent floods. In fact, by doubling the volume of free flowing water on the slopes, its soil eroding power is quadrupled and its capacity to wash the eroded soil is increased 32 times. One can, therefore, easily imagine the impact of the loss of vegetation cover on the rate of soil erosion and consequent siltation of the reservoir. It is well-known that excessive silt deposits have seriously reduced the life span and storage capacity of most of the reservoirs to such an extent that the validity of the cost benefit analysis originally done to justify their construction now appears to be doubtful. Sedimentation rates which are three to four times greater than the original anticipated rates provided in the design, have

been commonly observed. This sad state of affairs is a direct consequence of some of the practices adopted in the construction of major river valley projects. Most of the major projects gobble up a large tract of forest in submergence. Large forest areas are further cleared to provide cultivable land and rehabilitation sites for the affected population. The matter is further aggravated by letting loose a large labour force into the surrounding forest which goes on an indiscriminate felling spree for the sake of collecting and selling of firewood. The rehabilitation in the catchment further contributes to the destruction of the forest cover by the pressures of newly attracted population, also resulting in fire hazards and over-grazing, etc. All these demands on the forest lands are continuously shrinking the available forest land which is hardly 23% of the total area of the country.

Even though the advantage of intensive afforestation in the catchment and the upper reaches is self-evident and widely acknowledged, our field experience unfortunately is very discouraging. This is so, primarily because the soil conservation measures are long range in nature and require significant investments, both in manpower and resources. The implementing agencies, however, are merely interested in completing the construction and not in the long range measures which, according to them, can be safely left to other departments created for the purpose, which in turn, suffer from a total lack of coordination. This apparent neglect on the part of the Engineering Departments is due to their anxiety to project overall favourable cost benefit-ratios, even at the risk of neglecting the long range measures to maintain ecological balance so essential for the effective utilisation of the project. Opportunity cost calculations giving due weightage to the damage caused by the destruction of the houses, roads, schools, production facilities both in rural and urban areas or the cost of reconstruction activity needed to put the

afflicted community back on its feet are absolutely essential for a realistic cost benefit analysis.

The absence of environmental package of the preventive measures ultimately penalises the whole nation and some unfortunate few have to pay for the penalty even with their lives. This sorry state of affairs would continue until a comprehensive long-range plan is evolved for each basin to replace the present piecemeal ad-hoc approach. Considering the apathy of the situation and the lack of awareness of the problem by the Engineering community towards adopting long range measures, it is very necessary that public awareness must provide sufficient pressure to overcome the complex environmental issues. Fortunately, examples exist where sufficiently roused public opinion has been successful in this regard. The case of Chipco Movement in the Tehry Garhwal region which forced the authorities to stop logging operations in the region is a fine example.

Only a well-conceived long-range comprehensive plan incorporating the preventive and mitigative measures - both engineering as well as environmental - can prove to be beneficial to the country. The recurring loss of property, crops and human life is a sufficient justification to invest heavily in the long-term flood control measures. This is a common sense approach the neglect of which leads to vast devastation every year.