Journal of Environmental Sciences (China), Vol. 2, No. 2, pp 110–114, 1990 ISSN 1001–0742

Environmental protection and ecology–Indian experience

Dinesh Mohan[1]

Abstract—An attempt has been made in this paper to highlight some of environmental problems and suggest possible solutions for planning water resources development projects.

Keywords: river valley projects; environmental protection; ecology; India.

INTRODUCTION

Multipurpose River Valley Projects and other Development Projects have gained in volume and size since independence. The environmental impact of these projects, though faintly kept in the background, has not received any major attention and certainly much less attention than the technical aspects of the project. It was not until 1972 when the United Nations held a conference in Stockholm on Environment that attention was focussed on various developments of the modern age which led to the degradation of the environment and subsequent hazard to health and welfare to mankind. The government of India set up a Department of Environment in 1978 and constituted Environmental Appraisal Committees for the following sectors:

Multipurpose River Valley Projects;

Industrial Projects;

Mining Projects;

Thermal projects.

All medium and large development project falling in each of the areas are examined in depth by each committee and they can be executed only after an environmental clearance is obtained.

The government of India have also recently got the parliament to pass a legislation called "The Environmental (Protection) Act 1986" which gives wide power to the Department of Environment for control, monitoring and punishment to ensure adequate safeguard for environmental protection.

CASE STUDIES

Out of the various environmental factors that get affected by a River Valley Project only five major ones have been considered.

These are:

Health effect;

---

[1]Ex-Director, Central Building Research Institute, Roorkee, India.

Plant genetic resources;

Water logging and rise in salinity of irrigated soil;

Soil erosin in the catchment area and rapid silting of the reservoir;

Socio–cultural impact.

Health effect

Creation of a large and stagnant water body and diminutive flow down stream is known to have resulted in the introduction of water borne diseases through vectors such as snails. These have also led to an increased incidence of malaria, filaria and schistosome. The loss to the nation, in terms of man hours lost and additional cost of medicare, can sometimes be crippling when health delivery systems are already in a precarious state in these areas. A proper and systematic study of the effect of water body in the enhancement of water borne diseases is therefore essential.

Plant genetic resources

The main food eaten by human beings–maize, wheat and rice, have been developed from their wild varieties and weedy relatives which hardly gave an yield. The prosperity of mankind depends upon our capability of keeping the new and high yielding varieties of food crops free from destruction by insects and pests which thrive under conditions of intensive agriculture. To overcome these, our plant breeders have to turn to their genetic resources found in the primitive type varieties and their wild relatives. These are important resource and often the only source of pest and disease resistance worth millions of rupees of adaptation to difficult environment and other agronomical valuable characteristics such as the dwarf habit in rice and wheat which has revolutionized their cultivation and led to the famous Green Revolution making India almost self sufficient in food. Preservation of areas rich in plant genetic resources as Biosphere Reserves and preventing them from inundation under the reservoir created by the dam is thus imperative.

Water logging and rise in salinity of irrigated soils

Perennial irrigation in the command areas raises the water table which builds up salinity in the soil with consequent loss in soil productivity. According to the estimates of the ministry of agriculture, about 10 million hectares, out of a total of 42 million hectares (24% of irrigated area) under agriculture has been affected by waterlogging and salinity. A case study of the Mahi right bank canal command area in Gujrat, conducted by the Water Technology Center of IARI has shown the hazards of neglect in command area development. The data collected for the study indicated that the incidence of malaria had substantially increased since the introduction of irrigation in 1958. Anopheles Cullicitacies was found to be the major malaria vector mosquito in the area which bred extensively during the monsoon and later thrived in the irrigated paddy fields. The use of inadequate water through dug wells and tube wells had declined after the availability of cheaper canal water. The water table had consequently risen at a spectacular rate. In 1966 the water table was below 5m in about the entire study area. In 1982 over 80% of

the region had water within 3m and the water in 1985 was as high as within one meter of the surface in about 20% of the area. The problem of waterlogging due largely to under utilization of the irrigation potential, inadequate drainage facilities and poor canal regulation at the farm level, excessive release of canal water during monsoons, low ground water utilization and poor maintenance of the drains have added to the problem.

Reclamation of waterlogged and saline soils is very expensive and time consuming operation. Provision of proper drainage works and their proper maintenance are thus very essential. Yet it has not been easy to get a proper Command Area Development Plan from the project engineers along with their environmental impact reports.

Rapid silt–up of reservoir due to soil erosion in the catchment area

Most catchments contain certain badly denuded area. There has also been considerable deforestation and agricultural activity in these areas. All this has resulted in rapid silting of reservoirs and shortening of their life expectancy. It is a matter of concern that the capacity of Nizamsagar reservoir has been reduced to less than half (from about 900 million m^3 to less than 340 million m^3) and there is not enough water to irrigate the 1100 km^2 of sugar cane and rice for which it was intended and hence not enough sugar cane to supply to local factories.

Similar has been the case with the Bhakra reservoir. The live storage capacity is believed to have come down by 5.8%. It is 5.5 acre feet against the original 6.03 million acre feet in 1963. Similarly its dead storage, vital to the project, it said to have lost a good 20.77% from 1.97 to 1.59 million acre feet. The situation for the Pong reservoir and the Pandoh dam is still worse. The dam is a 435 feet high earth and rock fill dam. The project had envisaged a silt inflow of 20,500 acre feet per year but the last two surveys for 1982–1984 and 1984–1986 showed that the silt flow shot up to 260514 and 340182 acre feet respectively, reducing its life expectancy considerably.

The above three case studies pointed out to the imperative need of a proper catchment area treatment plan in advance of the project and a proper management of the area during and after the construction of the dam which should include safeguards against deforestation, overgrazing and cultivation. This is another area where considerable resistance is encountered from the project engineers with the plea that the dam has not added to the soil erosion and the catchment area treatment would considerably add to the project cost throwing cost benefit ratio out of gear. The plus points of the catchment area treatment are seldom appreciated.

Socio–cultural aspect

Relocation affected human settlements could strain and disrupt the social fabric. Effort should therefore be directed towards preservation and if possible, even betterment of their quality of life, and not merely paying them monetary compensation as is the prevailing practice. This could be achieved by:

Providing house plots and agricultural plots of equal area in the command area of the project.

Identification and implementation of educational and vocational training programmes that could be imparted to the effected population so that they could cope better with the new life style.

Resettlement area planning for housing and other amenities such as water supply, sanitation, school and health care buildings.

A proper rehabilitation plan is another report which is difficult to come by from the project authorities. The usual answer is that adequate cash compensation will be paid and ousters will be provided with jobs on the project during the construction. It is generally not appreciated that the construction work is for a limited period and the worker will again be jobless after the construction is over.

My committee is now examining each project critically and even after satisfying itself on major counts such as compensatory afforestation, command area development, catchment area treatment, rehabilitation and so on, recommends its clearance to the government subject to following safeguards:

Adequate fuel arrangement are to be made by the project authorities for the labor force engaged during the construction period.

Restoration of construction area is to be assured by levelling and filling of borrow pits, land–scaping and so on.

Regulated release of water through dam or barrage is to be assured so that a minimum flow is maintained in the rivers down stream during the lean flow season.

A monitoring committee is to be constitute in consultation with the department of environment for ensuring effective implementation of suggested safeguards.

The implementation of above and any other safeguard that may be stipulated later are carried out under the provision of environmental (protection) act 1986.

Finally, although I have discussed environmental impact of water resources projects only, similar approach has been adopted by committees dealing with other projects such as industrial, mining and thermal. Quite a few projects have also been refused clearance and one such example is the Silent Valley Project in south India because the scheme would have inundated tropical evergreen forest representing the richest biological community in terms of their productivity and variety of plant and animal species. Being among the least studied of all biological communities, it constituted a vast untapped resource which is bound to yield many more organism of great value with sufficient potential for increased biological richness.

CONCLUDING REMARKS

The case studies mentioned above show that the conventional approach of preparing reports on River Valley Projects, by taking into consideration the structural and hydraulic aspects of storage and diversion of water alone, is no longer valid. Instead, a multidisciplinary approach is needed which should aim at increasing agricultural and industrial production in the region

without any adverse effect on land productivity and environment.

REFERENCES

Department of environment, Govt. of India, New Delhi, Guidelines for Environmental Impact Assessment of River Valley Projects, 1985

Dinesh Mohan, Seminar on Environmental Considerations in Planning of W. R. Projects, Roorkee, India, 1986, 24–25 April