

Chapter – 10

Environment and Ecological Aspects of the Project

10.1 General

Survival of the mankind, with its alarming increase in population growth is linked in the long term, with a stable eco-system and increase in food production for which the development of water resources is unavoidable. The development of water resources projects mainly affect the environment because of reservoirs and its command by way of submerging cultivable and uncultivable land, displacement of population including the flora and fauna and resettlement in the surrounding catchment, denudation of natural forest, water logging, salinity and alkalinity of soil, water quality, water table change etc.

The environment is degraded by both inappropriate and lack of development. In respect of disturbance of environment, there are two schools of thoughts. One school of thought holds that ecological system is fragile and highly unstable. It is implicit, therefore, that environment should be left as much as possible in its natural state and its diversity should be preserved at any cost. Modification for the purpose of development should be minimal and confined to the range of tolerance limits of elements of ecological system. The second school of thoughts assures that the environment is globally stable and there is large element of built-in resilience in ecological system. In any case, it is realised that the water resources projects should be so planned that the existing eco-system should be disturbed to such minimum extent that the ultimate result of the project is not harmful rather it should be beneficial to mankind.

The impacts of environmental implications attributed to Water Resources Development can be broadly classified into three parts (1) Physical impacts, (2) Biological impacts and (3) Impacts on human life.

Some of the implications under Physical impacts are (i) sedimentation in storage reservoir which is the main cause in reducing the life of the reservoir, (ii) changes in hydrological regime due to large impoundments, (iii) water quality modifications, water logging and salinity caused by the excessive irrigation and seepage. The construction of dams create large volume of standing water, which are subject to biological and chemical changes. Over a period of years the reservoirs tend to become rich in nutritive substances. This process, known as Eutrophication, encourages increase in population of algae which may adversely affect the quality of water. The serious impact of storage reservoir in tropical countries is spreading of water borne diseases that affect millions of human beings. The two most important diseases are Malaria and Shistosomiasis.

The removal of people living in areas that may be submerged is the human impact. The fact that benefits of the projects usually goes to people living away from the affected areas and not to the displaced persons also creates resentment among them. Environment Impact Assessment of the proposed Parbati-Kalisindh-Chambal link project has been made in the following paragraphs.

10.2 Impact of reservoir

The proposed construction of the Parbati-Kalisindh-Chambal link will involve construction of Patanpur reservoir, Mohanpura reservoir and Kundaliya reservoir in Parbati and Kalisindh sub-basins. Seven storages/diversion reservoirs are also proposed to be taken up to provide irrigation to drought prone areas of upper Chambal sub-basin.

10.2.1 Submergence

Proposed Parbati-Kalisindh-Chambal link project involves creation of three reservoirs viz. Patanpur, Mohanpura and Kundaliya having total submergence area of 17308 ha. The total forest area in the submerged area is about 244.4 ha. The balance area of land excluding forest amounting to 17064 ha, comprises of agricultural land, cultivable waste land, roads, nallas and village habitats etc. Out of the total submergence area, the forest land is 1.4% and the balance 98.6% being culturable and other land.

10.2.2 Submergence area

The submergence details based on the surveys conducted by NWDA for these three reservoirs are given in Table-10.1.

Table 10.1
Details of submergence area

| Reservoir | Proposed F.R.L. (m) | Forest land (ha) | Culturable and Other land (ha) | Total area under Submergence (ha) |
|------------------|----------------------------|-------------------------|---------------------------------------|--|
| Patanpur | 419 | 69 | 2929 | 2998 |
| Mohanpura | 400 | - | 2510 | 2510 |
| Kundaliya | 378 | 175 | 11625 | 11800 |
| Total | | 244 | 17064 | 17308 |

In the forest area, major plant species are Mahua, Teak, Salai, Babul, Amla, Tenua, Sheesam, Neem, Palas, Kari etc may come under submergence. The wood obtained from these forests can be utilised for construction of project, colonies etc.

Likewise the submergence details for the reservoirs to be created in the upper Chambal sub-basin, based on the toposheet studies are given in Table- 10.2.

Table – 10.2
Submergence details of the proposed reservoirs in Upper Chambal
Sub-basin

| Name of Reservoir | F.R.L. (m) | Total area under submergence | Forest area under submergence (sqkm) | No. of villages (sqkm) |
|--------------------------|-------------------|-------------------------------------|---|-----------------------------------|
| Sewarkheri | 499.8 | 11.5 | - | 9 |
| Padunia | 520.3 | 16.4 | - | 10 |
| Bachora | 498.4 | 12.8 | - | 7 |
| Ramwasa | 498.0 | 6.5 | - | 3 |
| Chitabad | A. 471.0 | 60.0 | - | 17 (linking to Rana Pratap Sagar) |
| | B. 471.6 | 62.0 | - | 19 (linking to Gandhi Sagar) |
| Sekri Sultanpu | 479.8 | 26.0 | - | 12 |
| Sonechiri | 476.8 | 22.4 | - | 11 |

10.2.3 Flora and Fauna

The forest in the catchment comes under the classification of southern tropical dry deciduous forests. Teak forest is predominantly found in the black cotton soils of Deccan traps whereas in the Vindhyan ranges mixed forests with inferior species are generally seen. The important species of forests, shrubs and grasses generally found in these areas are: Teak, Dhokra, Gurjan, Beli, Tendar, Salaran, Babul, Neem, Salar, Mahua, Shisham, Semal, Jamun, Karaya, Kahra, Kulyu, Bel Bahera etc.

Panthers, Wild Pigs, Sambhars, Chhetals, Chinkaras, Banders, Ravin deers, Bares, Monkeys, Fox are some of the common mammals seen in this region. The common birds in the region are Baya, Koyal, Vulture, Parrot, Bulbul, Jungle crow, House sparrow, Owl, Kite, Green Pigeon, Sand groves, Peafowl, Quail, Grey partidge etc. The fish fauna consists of some of the important varieties like Katla, Rohu, Kalbau, Gol, Labeo, Bata, Mirgal, Barhva, Serana etc. Other aquatic species include Crab Turtles and Snail. The most poisonous reptiles are Cobra and Russels viper.

As the forest area under submergence is very less, there will be very little impact on the flora and fauna of the region due to creation of the reservoir.

10.2.4 Water logging and water quality

Introduction of irrigation project in any area leads to increase recharge to ground water table. Water logging condition of soil depends on depth of ground water table, status of surface drainage and type of the soil. Studies have revealed that generally where the level of water table is within 1.5 m of the ground level for at least four successive months, water logging condition occur.

In the proposed reservoir sites, the drainage condition of the catchment is fairly good. The depth of ground water varies from 9 m to 24 m. Fluctuation of water level during post monsoon and pre-monsoon seasons is on an average from 2 m to 5 m.

Due to storage, the quality of water is also likely to be changed by way of elevated level of plant nutrients application, the growth of aquatic weeds, stratification of temperature and dissolved oxygen. The water quality of the Parbati, Newaj and Kalisindh rivers are good enough as discussed with the officials of Water Quality Monitoring Stations of the M.P. Govt. With a little treatment, the water can be made potable for human consumption.

10.2.5 Rehabilitation & Resettlement

It is the responsibility of the concerned project authority to rehabilitate and resettle the displaced population. There will be rehabilitation committee responsible for resettlement of the oustees in accordance with the guidelines, which include life support systems besides housing and related infrastructure in proximity to their existing habitation; land for land compensation to the agricultural oustees etc. Acquisition of land from the beneficiaries of the project will also have to be explored.

10.2.6 Beneficial impact

Apart from irrigation power generation & water supply the project will give adequate employment opportunity during construction as well as maintenance stage. The creation of the reservoir will increase the fish production and development of Pisciculture in the region. Many families will get job in the fisheries, which will also reduce the resettlement problem.

Each resettlement colony will be provided with water supply facilities, recreation facilities, schools etc., which will improve the life style of the people.

10.3 Impact of the canal system

10.3.1 Land acquisition and resettlement

The proposed canal system will acquire total land of about 34.50 sqkm from Patanpur to Rana Pratap Sagar on actual basis of survey considering average width of land acquisition as per the cutting & filling, as may be the case along the canal, branch, distributary, major structures and colony area etc. Out of this, 0.40 sqkm will be forest land in Rajgarh protected forest traversed by link canal in 2.25 km between the reach from 21 km to 23.25 km.

From Patanpur to Gandhi Sagar Alt.(b)-I, the link will acquire total land of 34.49 sqkm. There is no forest land under this alternative. In the second alternative of Patanpur to Gandhi Sagar Alt.(b)-II, the link will acquire total land of 25.80 sqkm. In this alternative also, there is no forest land to be acquired. Afforestation is proposed to be done on the spoil banks of both side of canal to compensate the loss of plantation.

Very little private land will come under land acquisition and the displacement of people will be minimum. However, the rehabilitation committee will look after the displaced problems.

10.3.2 Water logging

The canal is proposed as a lined canal throughout its entire length and thus the seepage will be too less to affect the water table. Besides, since the area is having a good drainage condition, no water logging problem is anticipated.

10.3.3 Beneficial impact

Besides ensuring irrigation facilities for enroute command, the canal will provide employment opportunities to a number of people during its construction and maintenance period. The increased irrigation facilities will increase the production of food grain, which in turn will improve the socio-economic standard of the people of the command area. The growth of plantation on either side of the canal, all along its route will improve the environment.

10.3.4 Proposed period of construction

Parbati-Kalisindh-Chambal link canal project is proposed to be completed in two phases. The first phase will consist of construction of the link canal and three enroute reservoirs namely Patanpur, Mohanpura, Kundaliya, barrage at river Ahu and other CD structures. The second phase consists of construction of 7 reservoirs viz. Chitawad, Sonechiri, Ramwasa, Sewarkheri, Padunia, Bachora and Sekri Sultanpura. The entire work is scheduled to be started simultaneously and completed in a period of eight years.

10.3.5 Labour

A large force of labours will be required during construction of the project. The labours both skilled and unskilled are available in the vicinity of the project areas.

10.3.6 Population density

The population density in the submergence area of the reservoirs is about 156 persons per sqkm, which is slightly more than the population densities of 149 and 128 persons per sqkm for Madhya Pradesh and Rajasthan states respectively.

10.3.7 Villages affected and population displaced

The number of villages, families and the population affected due to submergence of each of the three reservoirs are given in Table 10.3.

Table 10.3
Details of villages and population under submergence

| Reservoir | No. of Villages | No. of families | Population as per 1991(census) Human |
|------------------|------------------------|------------------------|---|
| Patanpur | 22 | 851 | 4255 |
| Mohanpura | 8 | 506 | 2530 |
| Kundaliya | 35 | 4054 | 20270 |
| Total | 65 | 5411 | 27055 |

Thus it is seen that 65 villages in whole or part will be affected. The total number of families to be affected will be 5411. However the human population requiring rehabilitation will be 27055 persons as per 1991 census. More details regarding submergence have been discussed in Chapter-7 'Reservoirs'.

10.4 Details of developmental activities in the affected area

There is no developmental activity programmed in the likely submerged area of reservoirs because these areas are thinly populated with poor communication network.

10.5 Physical aspects

The impoundment of water in reservoirs will improve the condition of the ground water aquifers in adjoining area. Landslides are not expected in the periphery of reservoirs. There will be improvement in the land use pattern and practice. Some aquatic life and vegetation may grow along the periphery of the reservoir, which is expected to be harmless. This impounding of water will also provide relief to the flood affected villages located in the downstream of reservoirs.

10.6 Resources impact aspect

There has been no identification of submergence of mineral deposits, monuments, recreational facilities etc. The reservoirs will submerge an area of 17308 ha out of which 244 ha is forest and remaining is under culturable and other land. Sixty five villages will come under complete submergence affecting about 5411 families having a total population of about 27055. The population displaced will be rehabilitated on proper location and provided with modern amenities. Also suitable compensations will be made to affected population and forest. The impoundment will improve the aquatic life such as fish, crocodile's etc. The reservoirs will increase the production of food grain.

10.7 Socio-cultural aspects

Out of total population, about 22.3% belong to scheduled castes. The people earn their livelihood through cultivation of crops and working as labour in fields. The livestock also provides sizeable earnings. When the affected families will be shifted to new places having all civic amenities such as, water supply facilities, medical facilities, schools and community building for recreation purposes, there will be general improvement in the life style of the people and their culture

10.8 Public health aspects

The formation of reservoirs is not expected to create any public health hazards. The reservoirs are located in remote areas having thin population density. It is unlikely that this area will attract much of population from outside, except during construction period for which adequate provision for medical facilities has been made.