

## **Chapter- 11**

### **Other Aspects of the Project**

#### **11.1 Foreign Exchange Element**

Majority of the requirements of plants and machinery, spares, equipments/ instruments, etc proposed to be procured/ hired would be met indigenously. However, at the time of construction, if the need for importing of specific equipment is necessary, then the requirement of foreign exchange for the same would be dealt with within the stipulated provision of foreign exchange policy of Government of India.

#### **11.2 Revenue**

##### **11.2.1 Domestic Water Supply**

Damanganga – Pinjal link has been planned as domestic water supply project for augmentation of domestic water supply of Mumbai city, as such, the main source of revenue from this project would be domestic water charges. The details on the same have been deliberated in Chapter – 6.

##### **11.2.2 Revenue from Power**

Two powerhouses; one each in the down-stream of Bhugad and Khargihill dams are proposed for hydropower generation. The total annual energy generation from the project has been estimated as 25.29 MU, out of which 9.09 MU would be from Power house at Bhugad dam and 16.20 MU from Power house at Khargihill dam. Based on the prevailing charges for consumption of electricity in Maharashtra state the annual revenue from the power component of project would be Rs. 688 lakh. The cost of installation of power house is Rs. 3531 lakh while the annual maintenance cost of power house installation will be Rs. 105 lakh, the interest on capital cost of power house @10% / year works out to Rs. 353 lakh. Thus, the cost of power house including its maintenance cost will be recovered in 17 years from the revenue generated from the hydro-electric power planned to be generated from the project.

### **11.2.3 Fisheries**

Damanganga – Pinjal link project has been planned as domestic water supply project to augment the domestic water supply of Mumbai city, as such Pisciculture has not been planned. However, creation of reservoirs at Bhugad and Khargihill will increase the natural fish production. It is estimated that about 525 Tonnes of natural fish can be produced annually in these two reservoirs.

### **11.3 Financial Resources**

After completion of the Detailed Project Report the techno-economic clearance will be obtained from Central Water Commission. The Union Ministry of Environment & Forest (MoEF) vide letter No.J-12011/56/2008-IA.I dated 03-12-2008 (Annexure -1.11 in Volume - II) indicated that the project being a drinking water supply project does not come under the provision of EIA Notifications,2006, as such environmental clearance from MOEF is not required, however the necessary clearance from Ministry of Tribal Affairs will have to be obtained. After obtaining these clearances the DPR will be submitted to the Planning Commission for investment clearance. The year wise requirement of funds for the construction of the project is furnished in Annexure – 7.8 in Volume - II. The entire cost for execution of the project will be met by Governments of Gujarat and Maharashtra.

### **11.4 Future Utilisation of Facilities Created (Buildings)**

Damanganga – Pinjal link envisages construction of two dams, two tunnels of total length of about 42.712 km and two power houses. To facilitate the office accommodation, stores, residential accommodation for the construction teams, two categories of buildings i.e. permanent and semi-permanent/ temporary are proposed to be constructed at various construction colonies/ sites and also in the near vicinity of Nasik/ Valsad. After the commissioning of the project, the permanent buildings will be utilized for operation and maintenance of the project while the remaining infrastructure

can be utilized for the future projects likely to come up in the vicinity or for offices of other State/Central Govt. organisations.

## **11.5 Legal Aspects of Damanganga – Pinjal Link**

### **11.5.1 Effect of Damanganga – Pinjal Link on the Territory of other States**

Damanganga- Pinjal link envisages construction of two dams (Bhugad dam and Khargihill dam); two tunnels connecting Bhugad reservoir with Khargihill reservoir and Khargihill reservoir with Pinjal reservoir; and two power houses (one each in the down-stream of Bhugad dam and Khargihill dam). The Khargihill reservoir; and both the tunnels are lying entirely in Maharashtra state, whereas the Bhugad reservoir intercepts an area of about 141 km<sup>2</sup> of Gujarat State in its catchment and remaining catchment area of Bhugad reservoir is in Maharashtra State. Out of total submergence area of 1903 ha of Bhugad reservoir about 987 ha area is in Gujarat State and remaining 916 ha in Maharashtra State.

### **11.5.2 Existing Interstate Agreement on Sharing of Damanganga Water**

The Government of Gujarat has constructed Madhuban dam (Damanganga project) across Damanganga river for utilizing the waters of Damanganga river generated from the catchment area lying in the territories of Gujarat state and UT of Dadra & Nagar Haveli. For facilitating the construction of the project and for sharing of cost and benefits, an agreement was signed amongst the Gujarat State and UTs of Dadra & Nagar Haveli and Daman & Diu (Annexure – 11.1 in Volume - II). The project is functioning since 1987. Bhugad dam of Damanganga – Pinjal link is proposed in the up-stream of existing Madhuban reservoir and will intercept about 141 km<sup>2</sup> of Gujarat catchment area of Madhuban dam. To ensure that the planned benefits of the existing Madhuban dam are not hampered due to construction of proposed Bhugad dam, the quantity of water intercepted by the proposed Bhugad dam, has been planned to be released from Bhugad dam. With the mutual consents of both the states it has been decided that 91 Mm<sup>3</sup> water would be released from Bhugad reservoir for utilisation in Madhuban dam so that the functioning of Madhuban dam will not be

affected. The details have been discussed elaborately in Para 3.16 of Chapter – 3 “Hydrology and Water Assessment”.

## **11.6 Sharing of Water and Hydro Power**

For preparation of DPR of Damanganga – Pinjal link and Par – Tapi – Narmada link projects a tripartite Memorandum of Understanding (MoU) was signed by Hon’ble Chief Ministers of Maharashtra and Gujarat and Hon’ble Union Minister of Water Resources. As per this MOU, Maharashtra State Government will get the benefits through the Damanganga-Pinjal Link Project by way of augmentation of water supply to meet the domestic water requirement of Mumbai city, while Government of Gujarat will be free to utilise remaining water spilled from Bhugad & Khargihill dams. The issue of water sharing, quantum of diversion in link canal, exploring the possibilities of hydropower generation in Damanganga basin, extending the link to Tansa reservoir etc., raised by States are to be addressed during preparation of DPR.

### **11.6.1 Water Sharing**

The water availability studies of Damanganga – Pinjal link has been carried out by Central Water Commission (CWC) in consultation with National Water Development Agency (NWDA) and State Governments of Gujarat and Maharashtra. Based on this study, the issue of sharing of Damanganga water between the states of Gujarat and Maharashtra has been deliberated in two meetings with Governments of Gujarat and Maharashtra at the level of Chief Engineers held so far. The gross water availability at Bhugad and Khargihill dam sites and Damanganga basin as a whole, as worked out by CWC in the report is re-produced in Table 11.1 below. The Gujarat and Maharashtra governments in principle agreed that the sharing of water shall be based on the proportion of catchment area of the respective States duly accounting for the variation in catchment rainfall. The details are discussed under Para 3.16 of Chapter – 3 “Hydrology and Water Assessment”.

**Table – 11.1**  
**Gross Yield (Mm<sup>3</sup>)**

Dependability	Whole Damanganga basin	At Bhugad dam site	At Khargihill dam site	
			At original dam site	At alternative dam site
At 50% dependability	3223	733	939	923
At 75% dependability	2547	517	748	728
At 100% dependability	1839	372	477	469

### **11.6.2 Power Sharing**

Two power houses; one each in the downstream of both Bhugad and Khargihill dams are planned to generate hydro power through committed releases of water to meet the downstream requirements. It was agreed to by both the State Governments that the Government of Gujarat shall enjoy sole benefit of Hydro-Power likely to be generated by Power house downstream of Bhugad dam and the Govt. of Maharashtra shall enjoy the sole benefit of Hydro-Power likely to be generated from Power house downstream of Khargihill dam while the cost of construction of power houses shall be borne by respective State Government. The Details have been elaborated and discussed under Para 3.17 of Chapter – 3 “Hydrology and Water Assessment”.

### **11.7 Extension of Damanganga-Pinjal Link upto Tansa river**

A tripartite Memorandum of Understanding (MoU) has been signed by Hon’ble Chief Ministers of Gujarat State and Maharashtra State and the Union Government for preparation of Detailed Project Reports of Par-Tapi-Narmada and Damanganga-Pinjal Link Projects. Clause-3 of this MoU indicates that during the preparation of Detailed Project Report of Damanganga-Pinjal Link Project the issue of extending the link up to Tansa reservoir will be addressed. In pursuance to this, the National Water Development Agency had carried out the study on possibility of extending Damanganga-Pinjal link up to Tansa reservoir. As per the preliminary

studies, it was found that extension of Damanganga-Pinjal Link Project up to Tansa reservoir will involve lift.

Further, the Municipal Corporation of Greater Mumbai (MCGM) vide their letter No. ChE/WSP/4710 Dated 1<sup>st</sup> November, 2010 (Annexure -11.2 in Volume - II) requested NWDA to include the conveyance system in the DPR from Pinjal reservoir to a point at Pogaon near Agra road valve complex. Accordingly, possibility of extending the conveyance system beyond Pinjal reservoir up to Pogaon was studied on Survey of India Topo-sheets and a note on the study was sent to MCGM by Investigation Circle, NWDA, Valsad vide Letter No. NWDA/IC/V/T-112/2656-58 Dated 25<sup>th</sup> August 2011(Annexure – 11.3 in Volume - II). In response to this Chief Engineer, Konkan Region, Water Resources Department, Government of Maharashtra vide their Letter No.KRM/Misc/River Link/T-4(3)/7226 dated 20<sup>th</sup> September 2011 (Annexure – 1.5 in Volume - II) indicated that the Municipal Corporation of Greater Mumbai is carrying out the studies for the conveyance alignment for diversion of water beyond Pinjal and up to Pogaon. As such, NWDA has not carried out further study on extension of Damanganga-Pinjal Link upto Tansa reservoir.

### **11.8 Feasibility of Utilization of Water by Maharashtra State across Western Divide by Lift:**

Clause-5 of tripartite Memorandum of Understanding (MoU) signed amongst the States of Gujarat and Maharashtra and Union Government for preparation of DPRs of Damanganga-Pinjal and Par-Tapi-Narmada Link Projects indicates that the feasibility of utilisation of water by Maharashtra in their territory by lifting water over the western divide will be examined during preparation of Detailed Project Report of these link projects.

Accordingly, NWDA has prepared the Pre-feasibility of Damanganga (Ekdare)-Godavari Valley Link Project and circulated to Government of Maharashtra vide Letter No. NWDA /CE(S)/I.S Links/DG(EK)-GV/2010-DB/539-43 dated 25-3-2010 (Annexure -11.4 in Volume - II).

The Chief Engineer, Konkan Region, Water Resources Department, Government of Maharashtra vide their Letter No. KRM/Misc/River Link/T-4(3)/7226 dated 20<sup>th</sup> September 2011 (Annexure – 1.5 in Volume - II)

provided the preliminary details on the various diversion schemes for transfer of water from Damanganga, Nar and Par river to Godavari valley and Girna valley respectively. For firming up the various parameters for detailed studies on feasibility of the diversion schemes of Government of Maharashtra for utilizing the waters of Damanganga river and Nar & Par rivers by lift/gravity across the western Ghats in Godavari Valley and Girna valley, NWDA is carrying out the detailed topographical mapping of the area using Remote Sensing Data through Bhaskaracharya Institute for Space Application & Geo-informatics (BISAG), Gandhinagar. On completion of mapping of the area, detailed feasibility studies of the diversion schemes will be taken up.