CASE STUDY OF DIMBHE DAM

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Abstract: An integrated Kukadi irrigation project in western ghat of Maharashtra state in India comprises of five dams built the Kukadi River and its tributaries receiving seasonal rains. The water from four reservoirs namely Dimbhe, Manikdoh, Wadaj and Pimpalgaon Joge is fed to Yedgaon reservoir through canal and river. In the Kukadi integrated project the works of five dams namely Yedgaon dam, Wadaj dam, Manikdoh dam, Pimpalgaon Joge dam and Dimbhe dam are completed. The Reservoir has received a yield of more than 75% dependable yield only twice during the last 25 years since its completion. Among these we studied Dimbhe Dam. Dimbhe Dam is located in Northern Western Ghats of Maharashtra in Ambegaon tahsil. It is one of the prime dams in Pune District and it is unexplored.

Keywords: Dam, Irrigation, Hydroelectric Power Plant, Occupation carried – Agriculture and Fisheries.

INTRODUCTION:
The construction of Dimbe Dam started since 1992 and completed in 2000. It was constructed by Government of Maharashtra, India. Dimbhe Dam is built on Ghod River, near Ambegaon Taluka, Pune District, Maharashtra, India. It is in Ghod basin and is a part of Kukadi Project. The Ghod River is one of the major northern tributary of Bhima River. It rises on the eastern slope of the Sahyadri range at an altitude of about 1067.07 m. above M.S.L. It then flows down the valley along Ambegaon town, where the valley starts opening out. Upstream of Ambegaon, the valley is generally narrow and good storage basin is hardly available.

Dimbhe Dam is a Gravity dam and type of construction used is Masonary type. With completion of dam, storage as planned is created. Also the execution of canal system is nearing completion. The integrated Kukadi Project is planned to utilize 38.20TMC of water on water year. The Dimbhe Reservoir is having maximum storage capacity of 13.5 TMC.

Need of Constructing Dimbhe Dam:

Dimbhe Dam with Wadaj reservoir is planned to feed Yedgaon reservoir through Canal; while Manikdoh and Pimpalgaon are planned to feed Yedgaon reservoir through river. Due to less rain than estimated in Manikdoh catchment area the storage capacity is underutilized. In contrast, the Dimbhe catchment is drawing increased yield than estimated and excess spills over. Dimbhe reservoir is situated at a high elevation than Manikdoh reservoir.

Dimbhe Dam, is constructed to meet irrigation facilities provided to near about 19 villages. Not only it meets irrigation facilities for agricultural activities but also it provides occupation like fisheries. The dam also fulfills drinking water requirement of villagers.

STUDY AREA:

The study area consist of Western Ghats of Maharashtra of Sahyadri Hill range where five dams of Kukadi project are situated. Study area also extends upto command area in three districts of Pune, Solapur, Ahemadnagar.

GEOLOGY:
The subsoil exploration done with 18 bore holes result show that Deccan trap lava flaws comprising compact basalt, amygdaloidal basalt, volcaniv brachia and tachlyyte. Water bearing capacity of Deccan trap rocks have influenced engineering structure like dams. In Deccan traps regions various basalts are found. All basalts are non-porous when fresh there is no possibility of getting pores water from fresh undecomposed basalts and hence this region is selected for construction of this dam.

DAM DESCRIPTION:

Dimbhe Dam is masonary based gravity type dam. The height of dam is 67.21m (220.5ft) and length about 852m (2.795ft). Whereas, maximum height of dam from river bed is 67.65 m. The volume of dam is 1151.23km³. The dam is having second largest catchment area among five dams of Kukadi project, which is about 412 km²(115 sq. miles).The rainfall measured under the dam area is nearby 150 to 158 inches. According to the reports the area under submergence is about 5438 Acres (2202 Hectares).

Yield study at Dimbhe reservoir:

The yield series of Dimbhe reservoir for last 34 years reveals that the 75% dependable is 15.153 TMC. The maximum yield received is 42.37 TMC (year 1994) and minimum yield received is 7.71 TMC (year 2000). The 75% dependable yield calculated in year 1990 using 34 years records by Central Design Organization, Nasik is 17.565 TMC [2]. Thus over last 50 years the yield pattern
indicates that the 75% dependable yield ranges from 17.565 TMC to 15.153 TMC. Also from yield series, it is observed that out of 34 years, during 17 years the inflow at Dimbhe is more than 20 TMC. The yield available at Dimbhe with 50% dependability is 21.30 TMC. These factors are favoring the subject of augmentation of Manikdoh reservoir by linking Dimbhe reservoir for sustainable development of irrigation in the Kukadi project.

DIMBHE PROJECT AT A GLANCE
a) Location of dam – Across Ghod river, tributry of Bhima river

b) Name of project – KUKADI project, Dimbhe Dam (Major project)

c) Administrative approval–Govt.of Maha. I & P dept.(Bombey letter No. PM/3475/15547 – IP(4) dt.26.7.75)

d) Type of dam – Masonary Gravity dam

e) Purpose – Irrigation, Drinking Water, Fisheries and Hydroelectric Power generation

f) Year of Commencement – 1995

g) Year of Completion – 2001

h) Estimated cost as per DSR 120 – 80 Crores

Location
a) Location – Dimbhe Village, Between Ghodegaon and Bhimashankar.

b) Village – Dimbhe.

c) Taluka – Ambegaon

d) District – Pune

e) Name of Basin– Ghod River

f) Name of tributary – Bhima river

g) Latitude – 19°55’45”N

h) Longitude – 73°44’30”E

i) Catchment Area – 412 km²

j) Annual Rainfall – 150 to 158 inches

Dimbhe Left Bank Canal
a) Length Of Canal – 55km

b) Gross Command Area – 5060 hectares

c) C. C. A – 4048 hectares
d) I.C.A. – 2631 hectares

e) Cropped area in hectares – 2815 hectares

**Dimbhe Right Canal**

a) Length Of Canal – 132 km

b) Gross Command Area – 17978 hectares

c) C.C.A – 22382 hectares

d) I.C.A. – 14549 hectares

e) Cropped area in hectares – 15568 hectares

**DIMBHE DAM ON GHOD RIVER:**

The dam site is situated about 1.5 km. upstream of the supedhar. A steeply sloping spur almost touches the left bank of the river. The nose of this spur is connected to a steeply rising massive hillock on the right bank to the north of the Dimbhe (Bk.) village; good rock is exposed along the left bank as well as in the river bed. After taking in to account the results of trial bores Government has given approval for this alignment and the construction of dam is already started on this line.

The location of this dam is situated on 190-5’-45” North Latitude and 730-44’-30” East Longitude. It is easily approachable by asphalt road on the right bank of river taking off from the Manchar town on the Pune-nasik road i.e. National Highway No. 50. The dam site is about 25 km. away from the Manchar town. There are no good means of communications on the left bank, as county is more or less hilly.

26 Dimbhe Left Bank Canal takes off from the reservoir on the left bank and Dimbhe Right bank Canal takes off from Dimbhe Left bank canal In Km. No. 3. The outlets have a maximum discharging capacity of 39cumecs with three gates in fully opened condition. Total storage capacity of dam is 382.06Mcum (13.50 TMC).

**HYDRO POWER PLANT:**

**SPECIFICATIONS** –

Top of water for power generation:

a. Maximum Top -40.395 m
b. Minimum Top – 11.69m
c. Absolute Top – 38.00 m (22.45cu.m/cm)

Turbine:

a. Type of Turbine – Verticle Caplan
b. Capacity – 5155 kW
c. Revolution per min – 375/min

Generator:

{Type – Top bracket shaft coupled}

a. Voltage – 6.6kW
b. Revolution per min – 375/min
c. Capacity – 5115kVA

Power Generation per Year : 17.99(10 lakh unit)

**Shape of Hydro Power Plant:**

Hydropowerplant Size – 16.60m * 14.35 m
OCCUPATIONS TO BE CARRIED:
Dimbhe Dam is located in Deccan trap, in between Sahyadri Hill ranges. And hence, main occupation in this region is Agriculture. The villages nearby not only depend on agriculture but also have developed fishing skills. The detailed study of occupations is as follow:-

1) AGRICULTURE: Kukadi project planned irrigation for only Kharip and Rabi season and not for summer season. Total irrigation capacity of Kukadi project is nearly 156278 hectare and at the end of 2004, irrigation capacity fixed for 114271.

Season-wise irrigation capability of Dams in kukadi project hectare area is described in “Department kukadi irrigation project divisional office No. 1 Vol. I page 3.”. According to the report, the irrigation capability of Dimbhe Dam in Kharib is 11184 hectares and for Rabi is 20090 Hectares.

Due to heavy rainfall in rainy season and dry conditions in winter two types of crops are plant here – ‘Rabi’ as well as ‘Kharib’. Dam provides water to Yedgaon reservoiv , but at same time it works for irrigation purpose.

Water utilization for Dam is as follows –

Source: Department kukadi irrigation project divisional office No. 1 Vol. I page 3.

<table>
<thead>
<tr>
<th>Sr NO.</th>
<th>PARTICULAR</th>
<th>DIMBHE DAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Total storage</td>
<td>13500</td>
</tr>
<tr>
<td>02</td>
<td>For Yedgaon Dam</td>
<td>6217</td>
</tr>
<tr>
<td>03</td>
<td>For Irrigation</td>
<td>7010</td>
</tr>
<tr>
<td>04</td>
<td>Evaporation</td>
<td>806</td>
</tr>
<tr>
<td>05</td>
<td>Carrying Outgoing</td>
<td>633</td>
</tr>
<tr>
<td>06</td>
<td>Total 3+5</td>
<td>8449</td>
</tr>
<tr>
<td>07</td>
<td>Total 2+6</td>
<td>14666</td>
</tr>
</tbody>
</table>

The dam provides irrigation facility to 19 villages. The mostly cultivable crops in this area are Rice, Corn, Wheat, Jowar etc. In rainy season due to heavy rainfall, no other plants can be growned and hence rice is the main product here.

Earlier the only crops harvested were bajra and jowar in Dimbhe Dam region. Farmers could baerly cultivate once a year. Now crops diversity include tomatoes, potatoes, groundnut, wheat, sugarcane, etc. Village under Dimbhe Dam also export quality custard, pomegranate & grapes. Farmers take three rounds of crops in a year instead of one. The sugarcane is sent to Pargaon Co-operative Sugar Factory, with realization the villages are slowly shifting toward drip irrigation. They are also keen on learning sound crop water management and organic farming practices.

Negative effects while cultivation of rice –

For cultivation of rice and blocking of rainwater, villagers here are making plains on steep slopes of mountains. Because of this, trees holding soil of mountains are becoming less; and this results in landsides.
Agricultural practices in nearby villages of Dimbhe Dam.

RICE CULTIVATION
The many tribals who were displaced by the Dhimbe dam lost their land but not their livelihoods. They took up cage fish farming and figured out an alternate form of cultivation.

Cage farming at Dhimbe dam, Maharashtra

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Table No. 3.5 Dam-wise canal irrigation capability in kukadi project

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Storage Dam</th>
<th>Name of the canal</th>
<th>Kharip irrigable area in hectares</th>
<th>Rabi irrigable area in hectares</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Yedgaon Dam</td>
<td>Kukadi LBC system</td>
<td>46846</td>
<td>49550</td>
</tr>
<tr>
<td>2</td>
<td>Manikdoh Dam</td>
<td>Manikdoh LBC</td>
<td>1178</td>
<td>1246</td>
</tr>
<tr>
<td>3</td>
<td>Wadaj Dam</td>
<td>Meena feeder canal</td>
<td>1854</td>
<td>1961</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Meena branch canal</td>
<td>7807</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wadaj RBC</td>
<td>187</td>
<td>198</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>57872</td>
<td>52955</td>
</tr>
<tr>
<td>4</td>
<td>Pimpalgaonjoge Dam</td>
<td>Pimpalgaonjoge LBC</td>
<td>5985</td>
<td>6330</td>
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<tr>
<td></td>
<td></td>
<td>Pushpawati canal</td>
<td>905</td>
<td>954</td>
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<td>Total</td>
<td>6890</td>
<td>7287</td>
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<tr>
<td>5</td>
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<td>Dimbhe LBC</td>
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<td>8003</td>
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<td></td>
<td></td>
<td>Ghod branch</td>
<td>2221</td>
<td>2382</td>
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<td></td>
<td></td>
<td>Meena branch</td>
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<tr>
<td></td>
<td></td>
<td>Total</td>
<td>75946</td>
<td>80332</td>
</tr>
</tbody>
</table>

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2) FISHERIES
The many tribals who were displaced by the Dhimbe dam lost their land but not their livelihoods. They took up cage fish farming and figured out an alternate form of cultivation.

Cage farming at Dhimbe dam, Maharashtra
Dimabhe Dam is located near the tourist spot of Bhimashankar in Maharashtra. With a capacity of 13.5 million cubic meters, the dam displaced 1253 families, submerged 11 villages and partially affected another 13 villages when it was completed in 2000. Today 19 villages are situated on the fringes of the Dimbhe reservoir, which provides irrigation to about 14,000 hectares of land. Farmers affected by this lost their agricultural lands and were left with very few options, which included going off to nearby cities to look for jobs. That's when Shashwat, an NGO based out of Manchar working in the area for improvement of livelihoods in a few villages came into the picture.

A fishers Co-operative is formed. The Dimbhe Jalashay shramik adivasi ‘Machimar Sahakri Society Maryadit Digad’, was setup in 2006. As per the fisheries department fish seed totalling Rs.9 lakh and 9000 fishherlings casting Rs.3.80 lakh were to put in the reservoir in the first year itself.

Through the year 15,000 seeds are grown in one cage of dimension 3m *3m*3m. Before cage fishing commenced the farmers made very easy little moneysome as less as Rs.30,000. For one crop season since 2006, 214 fisher families have come together.

Conclusion:
The above report gives detail information about Dimbhe Dam. The case study shows all detail study of the dam. Each and every part i.e. Dam description, it’s need, geology present there, etc. The study also give details about Hydro Power Plant, Agricultural practices done in this region with the help of Dimbhe Dam. From above report, we get to know that how this dam have great importance in this region and how it makes able the villagers to survive. The dam also changed people’s journey from farming to fisheries and made it their occupation. And hence it is one of the unexplored dam.

References: