CASE STUDY: INTER-LINKING OF BHIMA, KARHA AND NIRA RIVERS

[1]Ms. Shruti A. Satpute, [2]Ms. Siddhata P. Nazrekar, [3]Mr.Rutuj S. Shinde,
[4]Mr. Gouran S. Gaikar, [5]Mr. Parth Y. Gohil, [6]Prof Monal Tayade
Students, Dept. of Civil Engineering MAEERS Mit Polytechnic , Pune[1,2,3,4,5], Assistant Professor, Dept. of Civil Engineering MAEERS Mit Polytechnic, Pune[6]

ABSTRACT

River linking is a project of linking two or more rivers by creating a network of manually created canals ,and providing water to the land areas that does not have river water access and reducing the flow of water to sea using this means. It is based on the assumption that surplus water in some rivers can be diverted to deficit rivers by creating a network of canals to interconnect the rivers.

INTRODUCTION

The Indian Rivers Inter-link is a proposed large-scale civil engineering project that aims to effectively manage water resources in India by linking Indian rivers by a network of reservoirs and canals to enhance irrigation and groundwater recharge, reduce persistent floods in some parts and water shortages in other parts of India.

India accounts for 18% of the world population and about 4% of the world's water resources. One of the solutions to solve the country's water woes is to link rivers and lakes.

The diversified distribution of dominant water demanding features such as density of population, irrigable land is the context that the interlinking of rivers for inter basin transfer of water on a national scale has been `haunting individuals and even engineers for more than a century. Linking of rivers and trans basin diversion of water is not new in our country and also other parts of the world. Diversion of river waters for cultivation of crops has been taking place from historical times. During recent times, the linking of rivers such as the Beas-sultlej link and the diversion of waters on a large scale to far off areas in rajasthan through the rajasthan canal is an excellent example. The 440 Km Narmada canal with a capacity of 40,000cusecs in the initial reach is also to supply water to some of the districts in Rajasthan. The diversion of 40,000 cusecs of Ganga waters at Farakka Barrage has also proved very useful. The present National plan for linking rivers has several components. The main ones are :

(i) Himalayan components and

(ii) Peninsular riverlinks system.

OVERVIEW

➢ DETAILING OF KARHA RIVER-

Karha is a river flowing through the Indian state of Maharashtra. Its basin lies in the parts of Pune. The cities of Baramati, Saswad and Jejuri, the place of Lord Khandoba, lie on the banks of this river. Karha is a tributary of the Nira River. It is said that the Karha flows the fastest amongst the tributaries of the Nira River.

Karha is considered as one of the holy rivers. A temple of Lord Ganesha, one amongst the Ashtavinayaka, the Moreshwar of Moregaon is situated on the banks of the river. The river has a significant importance in Jejuri, considered holy for the devotees of Lord Khandoba. The origin of Karha River is near the Garade Village in Saswad Taluka and merges with the Nira River near Songaon in the Baramati Tehsil.

Karha River	
Native name	कऱ्हा नदी
Location	
Country	India
State	Maharashtra
District	Pune
Physical characteristics	
Source	Saswad
• location	Maharastra, India
Mouth	Nira River
• location	Maharashtra, India
Discharge	
• location	mouth

DETAILING OF NIRA RIVER-

Nira is a river flowing through the Indian state of Maharashtra. It is a tributary of the Bhima river and flows through Pune and Solapur districts of Maharashtra. Karha is a tributary of Nira.

This river originates in western ghats in pune district and flows from Bhor taluka, Shirwal Taluka Satara District, Solapur District and then meets Bhima Basin at Nira Narsingpur near Akluj. It then flows with the Bhima water to Solapur District. The Nira river meets the Bhima between Nira Narsingpur in Pune District and Malshiras Taluka in Solapur district. The dams built on the Nira river are Devdhar dam and Veer dam in Satara and Pune District.

Nira River नीरा नदी	
Location	
Country	India
State	Maharashtra
District	pune
Physical characteristics	
Source	
• location	Maharashtra, India
Mouth	Krishna River
• location	Andhra Pradesh, India
Discharge	
• location	mouth

➢ **DETAILING OF BHIMA RIVER-**

The Bhima River (also known as Chandrabhaga River) is a major river in Western India and South India. It flows southeast for 861 kilometres (535 mi) through Maharashtra, Karnataka, and Telangana states, before entering the Krishna River. After the first sixty-five kilometers in a narrow valley through rugged terrain,[1] the banks open up and form a fertile agricultural area which is densely populated.[2]

The river is prone to turning into gold during the summer season. In 2005 there was severe flooding in Solapur, Bijapur and Gulbarga districts.[3] The river is also referred to as Chandrabhaga River, especially at Pandharpur, as it resembles the shape of the Moon.

Source	Bhimashankar
• location	Maharashtra, India
• coordinates	19°4′19″N 73°32′9″E
• elevation	945 m (3,100 ft)
Mouth	Krishna River
• location	Telangana, India
• coordinates	16°24′36″N 77°17′6″ECoordinates: 16°24′36″N 77°17′6″E
• elevation	336 m (1,102 ft)
Length	861 km (535 mi)
Basin size	70,614 km^2 (27,264 sq mi)
Discharge	
• location	mouth

REVIEW OF LITERATURE

The concept of interlinking of rivers evolved during 1950s. At that time, the UN promoted such projects as part of "Stability and Peace". That was the time when big projects and technology were seen as the answer to poverty. It was also the time when many countries, after gaining independence from colonial powers wanted to express their national confidence through such major projects. The interlinking of Indian rivers proposal originated at the same time as the world became fascinated with large water infrastructure projects.

(i) Transfer of water is invariably to the adjoining basins and not across basins.

(ii)Irrigation channels are generally ridge channels suitable for distribution of water as distinct from valley channel suitable for drainage of water.

(iii) Water transferred is directly used, for irrigation in this case and not brought to a river in the receiving basin and hence does not constitute interlinking of rivers, and

(iv) Transfer of water takes place through gravity flows and does not require lifting by pumps.

From the above points, it is clear that interlinking of rivers through inter-basin transfer of water is different from intra-basin linking of rivers. Interlinking of rivers that is being talked about as a national programme will have the following characteristics:

(i) It envisages linking of rivers belonging to different basins, which may or may not be adjacent.

(ii) The primary purpose of link channels will be to transfer water of a river to another river of a different basin. Any other use of a link channel will be incidental to serve the primary purpose.

(iii) Neither the lateral slope available to the tributaries linking with their parent channel nor the longitudinal slope available to ridge channels for distribution of water will be available to link channels. Hence, the link channels will almost invariably have to operate with adverse slope, making pumping or input of energy

necessary. Also, the link channels, as any other channel, will be subject to seepage losses of varying magnitudes depending upon their surface and subsoil conditions.

(iv) As the objective of interlinking of rivers in the present context is to transfer water from water-surplus rivers/basins to water-deficit rivers/basins, the direction of flows in the link channel and its alignment will be determined accordingly.

WORKING METHODOLOGY

- **DILEMMA OCCURRED DURING PROJECT-**

  Why interlinking of river is important?

  How to store water ?

  How to fullfill water demand ?

  How to contribute water in drought area ?

  How to control floods ?

  What are the problems associated with the interlinking of rivers ?

- **WORKING PRINCIPLE-**

  FLOW OF KARHA RIVER AND CONTRIBUTION OF WATER RESOURCES IN DRAUGHT AREAS .

  * WE HAD SELECTED THE DRAUGHT AREA LIKE PURANDAR - TALUKA.

  * IT STARTS FROM - BHIWRI - (GARADE DAM)
  NARAYANPUR
  SASWAD
  KHALAD
  EKHATPUR
  BELSAR
  DHALEWADI
  KOTHALE
  NAZRE – (NAZRE DAM)
  JAWALARJUN
  PANDESHWAR
  SUPE

  * DISTANCE – 60 KM

  POPULATION – 6 LAKHS

  * LAND TO BE CULTIVATED – 40000 HECTARES

  CAPACITY – 5000 TMC

Indapur

Indapur is a town and a municipal council in Pune district in the Indian state of Maharashtra. Indapur is known for Jahagir of Shivaji's father and grandfather. Shivaji's grandfather Malojiraje died in battle in Indapur. It has National Highway 65 connecting the south and west region of India.

Indapur is a quiet hot place as it receives scanty rainfall. Shetphal lake is the major water reservoir in the district. Ujjani dam backwater along with Nira left canal and Khadakwasla canal system are major sources of irrigation and water supply for Indapur Taluka.

Elevation

527 m (1,729 ft) Area : 1993.92 hectares

Baramati

City in Maharashtra

Description Baramati is a city and a municipal council in Pune district in the state of Maharashtra, India. It is also the home town of the famous marathi Poet Kavivarya Moropant and former Chief Minister of Maharashtra and former Union Minister, Sharad Pawar.

The total geographical area of village is 2151.96 hectares. Baramati Rural has a total population of 19,387 peoples.

Elevation: 538 m

District: Pune

As water problem is facing in the villages of Baramati Lok Sabha constituency, water from Purandar Upsa Irrigation Scheme should be given to the farmers in this beneficiary area; Also, the water of Janai Yojana should be released to some villages in Daund taluka and the water from Shirsai Yojana should be released in the lakes of some nearby villages.

There are 50 villages on the Nazare project in Purandar taluka, Jejuri MIDC and about one thousand electric motors of the Upsa Irrigation Scheme in the dam. Therefore, agriculture in the benefit area does not get water. Therefore, it was demanded that the water of Purandar Upsa Irrigation Scheme should be given to the farmers in this beneficiary area at the rate of other farmers.

It was pointed out that the water of Janai Yojana should be released to some villages in Daund taluka and the water of Shirsai Yojana should be released in the lakes of the surrounding villages. "If water is released in the lakes at Malad, Kurkumbh, Jiregaon and Kauthadi Shiva at the same time in the rainy season, the problem of drinking water and water for livestock of these villages can be solved.

Development works in many villages have been sanctioned under the National Drinking Water Scheme and their funds have also become available. It was demanded that the work should be completed immediately.

Survey the Nira Left Canal Project

No survey has been carried out regarding water from the left canal of Nira Deoghar project in Bhor taluka through closed pipeline.

WE SELECTED CANAL IRRIGATION AS A BEST OPTION HERE TO SOLVE THE IRRIGATION WATER PROBLEMS-

- **CANAL SYSTEM-**

Canal Irrigation. A canal is an artificial channel that is constructed to carry water to the fields to perform irrigation. The water is taken either from the river, tank or reservoirs.

Permanent Canal-

A Permanent canal is a type of canal in which water is available throughout the year. This type of canal is generally directed from a permanent source of supply water bodies. Several Permanent hydraulic structures are constructed in this type of canal for water regulation and distribution.

CANAL IRRIGATION SYSTEM-

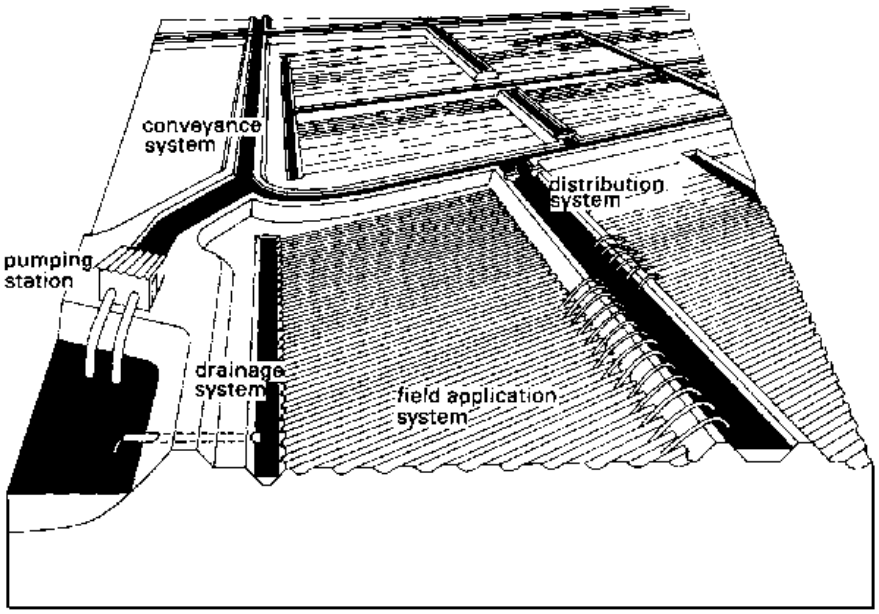
The irrigation system consists of a (main) intake structure or (main) pumping station, a conveyance system, a distribution system, a field application system, and a drainage system.

1.Main intake structure and pumping station

2. Conveyance and distribution system

3. Field application systems

4. Drainage system



The (main) intake structure, or (main) pumping station, directs water from the source of supply, such as a reservoir or a river, into the irrigation system.

The conveyance system assures the transport of water from the main intake structure or main pumping station up to the field ditches.

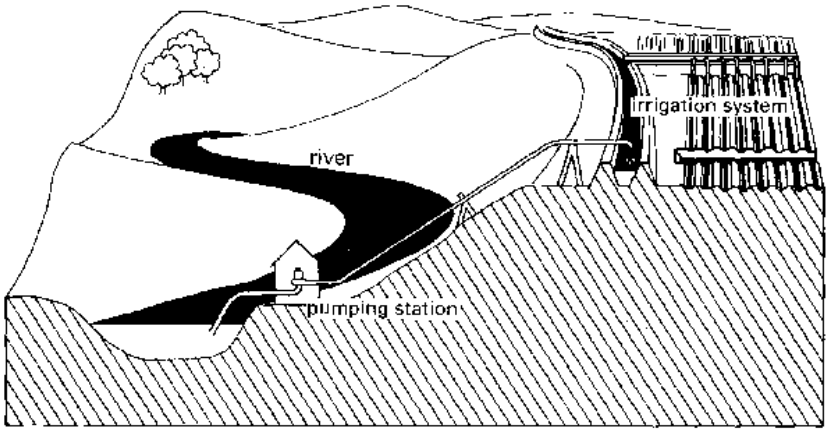
The distribution system assures the transport of water through field ditches to the irrigated fields.

The field application system assures the transport of water within the fields.

The drainage system removes the excess water (caused by rainfall and/or irrigation) from the fields.

Pumping station-

In some cases, the irrigation water source lies below the level of the irrigated fields. Then a pump must be used to supply water to the irrigation system.



Conveyance and distribution system-

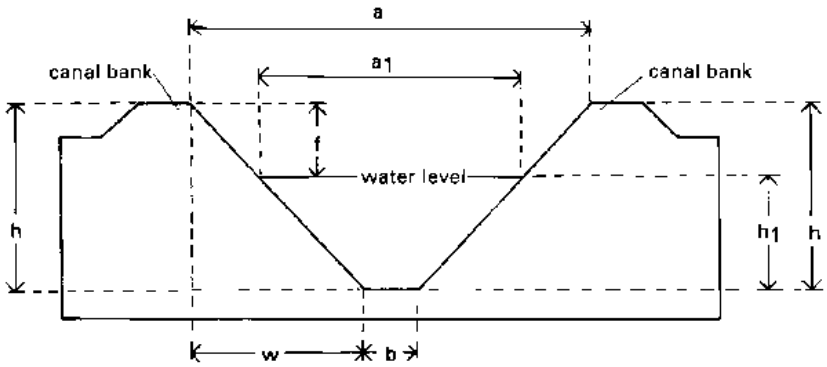
The conveyance and distribution systems consist of canals transporting the water through the whole irrigation system. Canal structures are required for the control and measurement of the water flow.

- **Open Canal-**

  An open canal, channel, or ditch, is an open waterway whose purpose is to carry water from one place to another. Channels and canals refer to main waterways supplying water to one or more farms. Field ditches have smaller dimensions and convey water from the farm entrance to the irrigated fields.

  The most commonly used canal cross-section in irrigation and drainage, is the trapezoidal cross-section. For the purposes of this publication, only this type of canal will be considered.

  The typical cross-section of a trapezoidal canal is shown.



a = top width of the canal
a_1 = top width of the water level
h = height of the canal
h_1 = heigth or depth of the water in the canal
b = bottom width of the canal
h:w = side slope of the canal
f = free board (= $h-h_1$)

Construction of a canal lined with bricks-

Lining canals is also an effective way to control canal bottom and bank erosion. The materials mostly used for canal lining are concrete (in precast slabs or cast in place), brick or rock masonry and asphaltic concrete (a mixture of sand, gravel and asphalt).

The construction cost is much higher than for earthen canals. Maintenance is reduced for lined canals, but skilled labour is required.

Canal structures-

The flow of irrigation water in the canals must always be under control. For this purpose, canal structures are required. They help regulate the flow and deliver the correct amount of water to the different branches of the system and onward to the irrigated fields.There are four main types of structures: erosion control structures, distribution control structures, crossing structures and water measurement structures.

i. Erosion control structures - a. Canal erosion

- **Field application systems-**

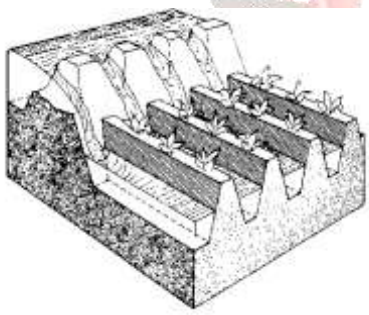
  There are many methods of applying water to the field. The simplest one consists of bringing water from the source of supply, such as a well, to each plant with a bucket or a water-can.

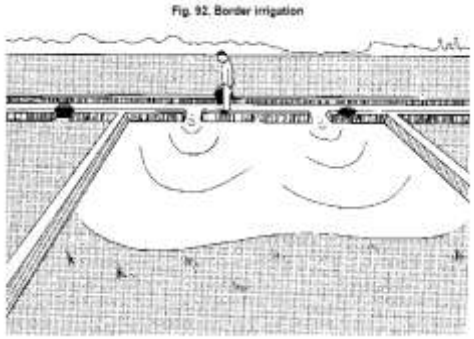
  1.Surface irrigation.

  2.Sprinkler irrigation

  3.Drip irrigation.

  4. Pumping.





HENCE, WE PROPOSE A CANAL IN THIS AREA –

- **ROUTE FOR CANAL:**

  1 .Indapur -

  2. Gokali -

  3. Nimgaon -

  4. Gotandi -

  5. Janksha-

  6. Baramati -

  7. Anjangaon -

  8. Margaon

  9. Jajuri -

  10. Daundraj gaon

11.Walhe

12. Mandki

13 Wathar BK

We propose a Permanent Open canal in this region to fulfil the irrigation water needs.

REVIEW

This review provides total analysis, we made before finalizing our objectives & areas of interest we want to work while developing our system.

As we propsed a canal in this area feasibility of project was discuused as it was proposed by government agencies it was a must go. A canal can perfectly fit in as to fullfill Irrigation needs and other uses.

CONCLUSION

From all the above points and discussion we arrive at a conclusion,

In this study case we discussed about ideas and methods about interlinking of BHIMA ,KARHA AND NIRA rivers for solving the irrigation water problems in nearby areas such as Baramati Indapur Saswad Jejuri areas which lie in near of these rivers.

We proposed a canal system for this region and studied about the ways and feasible route for a canal. We opted out for a permanent open canal system through our discussion and analysis.

If this study case is considered in real life it has a huge potential for solving the needs and problems in these areas.

REFERENCES

1. INTERLINKING OF RIVERS IN INDIA:ISSUES & CHALLENGES Dharmendra MEHTA(1), Naveen K. MEHTA(2). Geo-Eco-Marina 19/2013.
2. International Journal on Arts, Management and Humanities 3(2): 14-20(2014) "Interlinking of Rivers"Sonali A. More*Department of Geography, JET's Z. B. Patil College, Deopur Dhule, N.M.U. Jalgaon (MS).
3. http://www.nwda.gov.in/content/
4. Mr A. Ravinder is Research Scholar, Department of Geology, Kakatiya University, Warangal, Andhra Pradesh.YOJANA November 2004.
5. CHAPTER 5 - IRRIGATION SYSTEM http://www.fao.org/3/R4082E/r4082e06.htm
6. http://civil-resources.blogspot.com/2010/06/interlinking-of-rivers-in-india.html?m=1
7. https://en.wikipedia.org/wiki/Indian_rivers_interlinking_project