



INTERLINKING OF RIVERS IN MAHARASHTRA

S.A. NAGRE¹, Dr. S.T. SANGLE², Dr. A. V. TEJANKAR³

¹Expert Member, ²Former Professor and Head, ³Professor and Head

¹Marathwada Development Board, Aurangabad, India, ²Departments of Economics, Aurangabad, India, ³Departments of Geology, Aurangabad, India

¹nagre.shankar96@gmail.com, ²sanglest@yahoo.co.in, ³dravtejankar@gmail.com

DOI: [10.33329/ijer.8.1.11](https://doi.org/10.33329/ijer.8.1.11)



ABSTRACT

The concept of Interlinking of Rivers in India, is very old, that to before Mughal dynasty. Even Interlinking of Rivers has been done by the Engineer Sir Aurthur Cotton during British Colonial Rule. After independence also, the Interlinking of Rivers, is being considered as availability of surface water in various regions in the country, as it is uneven, with 77 % of water resources in North Zone only. The national water grid was therefore suggested by Dr. K. L. Rao in 1972 and Garland Canal by Capt. Thustur in 1974. Total 14 No. of Himalayan links and 16 of Peninsular links are identify for connecting the rivers in India. Out of these, Par-Tapi-Narmada and Damanganga-Pinjal are proposed links in Maharashtra. As per the recent guidelines issued by the GoM. On 7/3/2019, the surplus water of 2261 Mcum. in Godavari Basin, in Maharashtra is shown to be utilized for deficit of 8761 Mcum. in the state. The transfer the water for (8761-2261) 6500 Mcum. (230 TMC) is therefore proposed from W F R Basin of Kokan area to other basins in the state. However 2261 (80TMC) is proposed within Godavari Basin only.

Keywords- Water, Water Grid, Transfer of Water.

I. INTRODUCTION

The concept of inter linking of rivers in India is not new and has been for over five centuries. The Western Yamuna Canal and Agra Canal built in the Mughal dynasty by carrying water from the Himalayan Rivers to distant parts of Punjab, Uttar Pradesh and Rajasthan. The interlinking of rivers in India has been done during the British Colonial Rule, the engineer Sir Aurthur Cotton, who pioneered the development of water resources in southern India from 1839 onwards. He had proposed a plan for interlinking of Indian river for land navigation a small portion of the plan was implemented, but was abandoned later in- favour of railways for

import and export goods from its colony in South Asia.

In 20th century, Rajasthan Canal Project was executed by constructing dam across Beas river near Pong and a barrage at Harike and a Grand Canal System to carry water to drought prone areas of Rajasthan. Bhakra-Nangal Project, Parambikulam-Aliyar Scheme, Periyar-Vegai Link, Thungabhadra Project, Telugu-Ganga Project, Srisailam Right Bank Canal Project (SRBC) etc. are some of the inter-basin projects.

II. OBJECTIVE

1. To study the need for Interlinking of River.
2. To study the National Water Grid

3. To study the Interlinking of Rivers or Sub basins in the State

III. METHODOLOGY

Only secondary data like books, research papers, Reports of High Level Committees, Govt. Commission's report and websites, Interstate water plan etc., are used for the present research paper.

IV. NEED FOR INTERLINKING OF RIVERS

To meet increasing water demands, storage of monsoon flows is essential. Local small scale storage is useful, particularly for domestic supply, but cannot meet the full demand of high productivity agriculture, industry or metropolitan cities. For such large scale demand, there is no alternative to building storage reservoirs on our rivers. Many basins in the country are surplus in water resource even in ultimate stage of development while others face serious shortages. Creation of storages and inter basin transfer of water from surplus to deficit regions could therefore, be an option for achieving equitable distribution of water wealth and its optimal utilization. Hence, it is argued, if the resource abundant rivers like the Brahmaputra, Ganga, etc, could be linked with other rivers and a National Water Grid (NWG) created, the miseries of recurring of droughts and floods could be contained to a great extent. The popular appeal of interlinking rivers is based on the understanding that, an enormous amount of water of the rivers flow into the sea and that, if only this is prevented, and water transferred from water abundant rivers to water deficit areas, there will be adequate supply for everyone in every part of the country.

V. POINTS FOR DECIDING THE INTERLINKING RIVERS

1. For the existence and survival of human beings and livestock, basic needs like water and food are essential.
2. For overall development of the area, water is essential and help people in developing other fields and technologies.
3. Water can't be created, but can be transported from surplus areas to deficit areas.

4. Water, the nation's wealth, should be prudently distributed to all the areas of the country, for the prosperity of the people and progress of the nation.

5. Precipitation in our country is erratic & uneven in space and time.

6. The rainfall varies from 100 mm in the western parts of Rajasthan to over 10000 mm at Chirapunji in Meghalaya.

6. About 80% of annual precipitation occurs in just 4 months of monsoon period.

7. To cater to various needs judiciously for the balance period of the year.

8. Some areas are affected by floods, the others by drought.

9. The River Valley Projects are designed to provide 'carry-over' and 'flood storage' in the reservoirs to help in mitigating droughts and floods.

10. To increase food production to 500 million tons for the projected population of 1640 million by year 2050.

11. This is the era where wars would be fought not for land or ideologies but for water. Hence inter-basin transfer of water would solve the problems of 'water wars' and ecological imbalances to a large extent.

VI. NATIONAL WATER GRID

In the year 1972 Dr. K.L. Rao, the then Union Minister for Irrigation and power suggested that, 2640 km long Ganga-Cauvery link envisaged the withdrawal of 1680 cumecs (60000 cusecs) of the flood flows of the Ganga near Patna for 150 days.

VII. GARLAND CANAL BY CAPTAIN DASTUR

The proposal of Captain Dastur proposed in 1974 is popularly known as a garland scheme, with one canal for 4200 KM long and other canal for 9300 KM long from North Rivers to South. However, the Government prepared the National Perspective Plan in 1980 and in 1982 the National Water Development Agency (NWDA) was setup to carry out detailed studies on the issue. According to the Director General, NWDA Mr. Radhasingh, declared that the studies are scientific and incorporate

relevant data on survey and investigations, geological, geophysical and geotechnical, soil surveys of command areas, appropriate cropping pattern, socio and ecological compensatory a forestation. The project covered to link 37 river to transfer water from water surplus areas to relatively dry regions to 30 links / links canals spread over 9600 Kms the network will interlink 32 dams using 56 million tonnes of cement and 2 million tonnes of steel.

VIII. HIMALAYAN LINKS IDENTIFIED

It will have 14 national links as below :

- i) Kosi-Mechi
- ii) Kosi-Ghagra
- iii) Gandak-Ganga
- iv) Ghagra-Yamuna
- v) Sarda-Yamuna
- vi) Yamuna-Rajasthan
- vii) Rajasthan-Sabarmati
- viii) Chunnar-Sone barrage
- ix) Sone dam-Southern tributaries of Ganga
- x) Brahmaputra-Ganga (Manas- Sankosh- Tista-Ganga)
- xi) Brahmaputra-Ganga (Jogighopa-Farakka)
- xii) Farakka-Sunderbans
- xiii) Farakka-Damodar-Subarnarekha
- xiv) Subarnarekha-Mahanadi

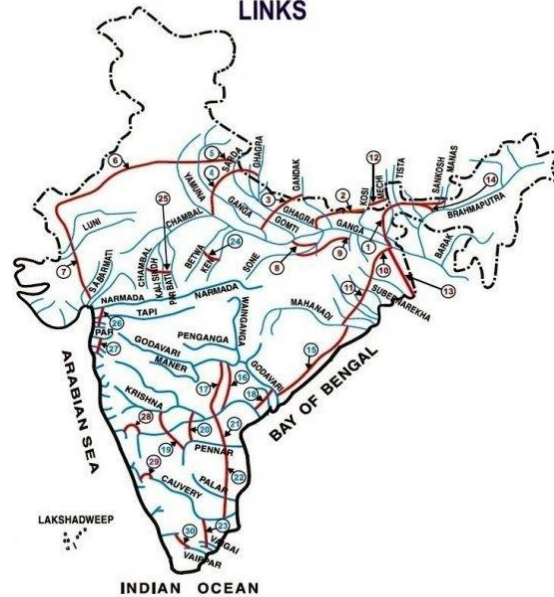
IX. PENINSULAR LINKS IDENTIFIED

It will have 16 national links as shown below

1. Mahanadi (Manibhadra) Godavari (Dowlaiswaram)
2. Godavari (Inchampalli)-Krishna (Nagarjunasagar)
3. Godavari (Inchampalli Low dam)-Krishna (Nagarjuna Tail pond)
4. Godavari (Polavaram)-Krishna (Vijayawada)
5. Krishna (Almatti)-Pennar
6. Krishna (Srisailem)-Pennar (Prodattuar)
7. Krishna (Nagarjunasagar)-Pennar (Somasila)
8. Pennar (Somasila)-Cauvery
9. Cauvery (Kattai)-Vaigai-Gundar
10. Ken-Betwa-Link

11. Parbati- Kalishind-Chambal
12. Par-Tapi-Narmada
13. Damanganga-Pinjal
14. Bedti-Varda
15. Netravati-Hemavati
16. Pamba-Achankovil-Vaippar

PROPOSED INTER BASIN WATER TRANSFER LINKS



Source: P.C. Bansil (2004) Water Management in India. Concept Publishing Co. New Delhi

X. MAJOR HURDLES IN IMPLEMENTATION OF SCHEMES

1. Negotiations among the Co-basin States/Neighboring Countries for arriving at Consensus and signing of water sharing and project related agreements. Preparation of Detailed Project Reports (DPR).
2. Funding and Implementation of the proposed projects.
3. Institutional mechanism and technology for executing the projects within frame work of 10-15 years.
4. Construction of Storage Dams and Canal Systems causing submergence and displacement of people.
5. Implementation of Resettlement and Rehabilitation (R&R) Package in true spirit

allowing national guide lines. Careful planning is necessary to ensure that the construction of projects and rehabilitation activities proceed simultaneously and smoothly.

6. Environment and Forest clearances / approvals.
7. Out of the 30 proposed links, 21 links are inter-dependent and are to be implemented after resorting to international agreements and inter-state problems.
8. Conformity of these proposals with the existing legal systems (the International Law, the Constitution of India and the relevant laws with in the country) needs a special examination and review.

XI. RIVER LINKING PROJECTS IN MAHARASHTRA

Maharashtra State is covered by six river basins viz. Godavari, Krishna, Tapi, West Flowing Rivers basin (WFR-Kokan), Narmada and Mahanadi. Large variation of natural surface water availability within basins and sub-basins exists in Maharashtra state in general. Average annual surface water availability varies from 0.16 Mm³/sq.km in Tapi basin to 2.07 Mm³/sq.km in West Flowing Rivers basin. Projects for interstate water transfer, inter-basin transfer of water within state as well as inter-sub-basin water transfer are in existence and are also being planned. Shortage of water resources, continuous drought situations or flood situations demand planning of such water transfer projects in aggrieved sub-basins or water deficit sub-basins in particular. Priority of water use is also equally important. Detailed feasibility for some of the schemes shows that these are technically feasible and economically sound schemes; however not all. For water transfer, schemes such as interlinking of rivers, interstate projects, intra state water transfer scheme involving water transfer from one basin to other or within basin from one sub basin to other sub basin are proposed. National and State water policies have underlined the principle of equitable distribution of water. It is also emphasized by Tribunal Awards which reads: “The cardinal principle of equitable distribution of water of river basin is

that there should be equitable apportionment of the benefits of river and needless wastage of water should be prevented and efficient utilization encouraged”.

XII. INTERSTATE WATER TRANSFER

Interstate Water Transfer is in the form of interstate projects, interlinking of rivers for either inter basin or intra basin water transfer and also barter method in a few cases of water transfer between the two states. Status of various projects and schemes existing and proposed for interstate water transfer related to Maharashtra is given in following paragraphs.

There are several interstate projects (Sharing the catchment area of other states with Maharashtra) planned within basin mainly for irrigation and Hydro Power generation. Water use sharing is mainly on the basis of geographical coverage of the catchments area of the respective states. The water use sharing is as per the Interstate agreements between the states or Tribunal awards. There are 34 interstate projects in the state, out of which 18 projects are completed, 10 projects are ongoing and 6 projects are future.

Information regarding basin wise no. of interstate projects, their total storage and live storage, total planned water use, share of concerned status in the water use. List of the interstate projects is given in below.

Table No. 01 Details of Inter State Transfer of water

Sr. No.	Basin	Status	No. of proj.	Live Storage	Water use
1	2	3	4	5	6
1	Godavari	Completed	17	3330	3647
		Ongoing	8	155	581
		Future	6	445	422
		Total	31	3930	4650
2	Krishna	Ongoing	1	679	766
3	Tapi	NIL	--	--	--
4	WFR (Kokan)	Completed			
			1	447	607

5	Narmada	Ongoing	1	--	--
6	Mahanadi	NIL	--	--	--
		Comp. 18, Progress10			
	Total	Future 6.	34	5056	6023

Table No.1 continued.....

Sr. no	Share of water use by concerned states				
	MH	Kar	Tel	M.P	Goa
	7	8	9	10	11
	3175	0	209	263	--
	520	0	59	2	--
	283	0	0	139	--
	3978	0	268	404	--
2.	653	113	--	--	--
3.	--	--	--	--	--
4.	143	--	--	--	464
5.	--	Power sharing only			
6.	--	--	--	--	--
Total	4774	113	268	404	464

Note:MH: Maharashtra, Kar: Karnataka, Tel: Telangana, MP: Madhya Pradesh

Source: GoM (2018) Integrated State Water Plan of Maharashtra. WRD VOLUME No. 1 Page No. 203

XIII. GUIDELINES FOR TRANSFER OF WATER

As per the section 16 of the Maharashtra Water Resources Regulatory Authority (MWRRA), the State Water Council (SWC) has to approve the water plan for each basin in the State. Similarly, the

Table No. 02 Transfer of Water from Surplus sub Basin to Deficit Sub Basin in the State

Donor Basin (Surplus)		Donee Basin (Deficit)				Total (5+7)
Basin	Qty. MCum	Intra Basin	Qty.	Inter Basin	Qty.	Mcum. (TMC)
			Mcum		Mcum	
2	3	4	5	6	7	8

Integrated State Water Plan (ISWP) is also to be approved for all the basins in the State, showing the position of water surplus and deficit basins / sub basins in the State.

The State Water Council has also given some guidelines for transfer of surplus water from one basin to another water deficit basin-

1. Identify water deficit basins / sub basins (Water Availability <3000 Cubic Meter per hectare CA) and water surplus basin / sub basins (water availability >8000 Cubic Meter per hectare CA).
2. Gravity Water Transfer Schemes from surplus basins to water deficit basins shall be taken up on priority.
3. No water shall be exported from average, deficit or extremely deficit basins/sub-basins; water shall be exported from surplus and abundant basin/sub-basins only and water above 8000 Cubic Meter per ha of CCA shall only be exported. From the above guidelines for the transfer of surplus water to deficit basin given by the Government of Maharashtra in Water Resources Department, it is very clear that-

When, water available or allotted (SW + GW) in the sub basin is up to 3000 um/Ha of culturable area, this deficit sub basin is to be treated as water needed or Donee sub basin. And water can be transferred to this basin to make-up the shortages.

When, the sub basin is having total available or allotted water more than 8000 Cum/Ha of culturable area, this surplus sub basin is only to be considered as Donor sub basin for transfer of water to the deficit sub basin.

Godavari	2261	Vidarbha	257	Tapi	1051		
		(Bembala)		(Purna)			
		M.Wada	553				
		(Penganga)					
		(Yeldari)					400
Total (1)	2261		1210	-	1051	2261	
						-80	
WFR	12448	Mumbai	1000	I.Godavari	3297		
		(Domestic Water)		M. Wada			
				Jaykwadi			850
				II.Krishna			890
				III.Tapi			463
Total (2)	12448		1000		5500	6500 (230)	
G.Total (1+2)	14709		2210		6551	8761	
(TMC)	-520		-78		-232	-310	

From the above table it is seen that, the Godavari basin, in Vidarbha region is having 2261 MCum of surplus water in some sub basin, after keeping water up to 8000 Cum/Ha of culturable area for the use of those sub basin themselves. Out of the surplus water.

257MCum: It is proposed to be used in (9TMC) Bembala deficit sub basin under Vidarbha region i.e. intra basin transfer of water.

953 MCum: This is also proposed as intra (34 TMC) basin transfer of water to be used in Marathwada (34 TMC) as 553MCum for recoupment of Penganga dam storage & 400 MCum for Yeldari dam, being replacement of water used by Vidarbha region in the upstream reaches of these dams.

1051 MCum: This water is also proposed (37 TMC) as inter basin transfer of water, for the deficit sub basin like Satpuda, Tapi South and Purna of Tapi Basin.

2261 MCum: Total Water Surplus in (80 TMC) Godavari Basin.

2. From the above table, it is seen that, the Godavari basin & WFR of Kokan Basin are having surplus water for transfer to other deficit basins.

The WFR of Kokan basin is of very much water surplus or abundant basin. All 28 sub basins are having surplus water of about 54870 Mcum (1940 TMC). Out of 28 sub basins, only 7 sub basins of north kokan are considered for transfer of water to Marathwada in Godavari Basin, Krishna Basin and Tapi Basin being the nearest or adjacent basins. The water proposed for transfer is as below.

1000 MCum: This water will be intra basin (36 TMC) transfer from WFR of Kokan Basin which can be used for domestic purpose in Mumbai city.

3297 MCum: Inter basin transfer of water (116 TMC) for Marathwada under Godavari deficit sub basins.

850 MCum: Inter basin transfer of water (30 TMC) for recoupment of Jaykwadi dam storage.

890 MCum: Inter basin transfer of water (32 TMC) for deficit area of Krishna basin.

463 Mcum: Inter basin transfer of water for (16 TMC) deficit Girna sub basin of Tapi basin.

6500 Mcum: Total from Kokan Basin(230 TMC)

XIV. CONCLUSION

Accordingly the sub basin wise planning is done for all six basins in the state. The WFR of Kokan Basin is having abundant water of about 1940 TMC in its 28 sub basins. Even 7 sub basins on the north side of Kokan basin, 440 TMC of water is surplus up to Ulhas sub basin. And hence this surplus water is proposed to be transferred as per requirement of deficit basins, with 146 TMC for Godavari basin, 32 TMC for Krishna Basin and 16 TMC for Tapi basin. Even the water of 36 TMC has also been proposed for domestic use of Mumbai city Corporations from these sub basins. Thus, the proposals of 230 TMC of water transfer are planned from Kokan basin as Intra and Inter Basin River Linking within the state of Maharashtra.

REFERENCES

- [1]. P. C. Bansil, A book on water management in India, 2004, Concept Publishing Company New Delhi-110059.
- [2]. GoM, WRD Report of the higher level committee on balanced regional development issues in Maharashtra. i.e. Dr. Kelkar Committee Report, 2013.
- [3]. GoM, P.D. Report of Water & Irrigation Commission MAH., 1999.
- [4]. Ministry of Water Resources Deptt. G.O.I. www.mowr.nic.in, 2007.
- [5]. GoM, Report of Committee on Equitable Distribution of Water, Oct-2010.
- [6]. GoM, Maharashtra Water Council Report on Inter Basin Water Transportation, April-2015.
- [7]. GoM, Maharashtra Act No. XVIII of 2005. Director of Government Printing and Publication, Charni Road, Mumbai.
- [8]. GoM, WRD Integrated State Water Plan for Maharashtra (2018) Volume No. 1