

A Case Study on Interlinking of Rivers In Andhra Pradesh (A.P)

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Abstract- At present, lot of nations in the world is suffering from inequality of water access, especially in INDIA. To overcome or satisfy this, interlinking major rivers seems to be popular solution. Though cost of construction is high, this is only a option available to solve water crisis with returns.

Interlinking of rivers(major) not only break India's major water crisis, But also serves as flood control, irrigation, drinking water and hydropower generation. In this paper we taken Andhra Pradesh state as a Case study and mention the alignments and links going on in the A.P and also In this paper we taken Kadapa District as a case study which is suffering from water crisis and going to give an analytical solution about on divert the kundu flood water and the project going on the Kundu river.

Keywords- Andhra Pradesh, Irrigation, Interlinking of rivers, Kadapa District, Kundu River

I. INTRODUCTION

River linking is a project linking 2 or more rivers by creating a network of manually created canals and providing water to the land areas that doesn't 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.

II. HISTORY ABOUT INTERLINKING OF RIVERS

- 1972-ganga Kaveri link proposal by Dr.K.L.rao.
- 1974- Garland canal proposal by captain Dastur.
- 1980-ministry of water resources frames the national perspective plan [NPP].
- 1982-the national water development agency [NWDA]set up to carry out pre-feasibility studies.
- 1999-the national commission [NCIWRDP] set up to review NWDA reports.
- Aug 15 2002-president Abdul kalam mentioned the need for river linking in his Independence Day speech.

- Oct 2002-supreme court recommends that the government formulate a plan to link the major Indian rivers by the year 2012.Dec 2002-government appointed a task force on interlinking of 37 rivers led by Mr. Suresh prabhu. Deadline was revised to 2016

Reasons and motivation of interlinking:

1. Regional rainfall variation:The summer monsoon accounts for more than 85% of the precipitation large part of Haryana, Maharashtra, A.P, Rajasthan, Gujarat ,M.P, Karnataka & T.N are not only in deficit in rainfall but also subjected to large variations, resulting in frequent drought and causing immersion hardship to the population and enormous lost to the nation.

2. Futuristic Demand for irrigation: At present estimate the ultimate irrigation potential of the country being stated as 113million ha. However, to feed the estimated 1.52 to 1.8 billion people in 2050 with 450 million times of food grains, India needs to increase its irrigation potential to 160 million hectors.

“Hence, strategies like inter-Basin water transfer are looked upon”

3. Domestic water needs: The per capital availability of utilizable water has been reduced progressively from 3450m³ to 1250m³ from 1951-2000 owing to the increasing population. In the next 50years, it's likely to come down to 760m³. Thus, at the house hold level, the per-capital availability has been reducing progressively and more than 25% of villages suffer from drinking water problems (Gupta2001).

4. To control floods and droughts: Floods are a recurring feature, particularly in Brahmaputra and Ganga rivers, in which almost 60% of the river flows of our country occur. On the other hand, large areas in the states of Rajasthan, Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu face recurring droughts. As much as 85% of drought prone areas falls in these states.

Need of Interlinking of Rivers:

- For the existence and survival of human beings and livestock basic needs water and food are essential
- Civilization were developed near river valleys, Indus valley etc. culture and science were developed from these places and spread to other places
- For overall development of the area, water is essential and help people in developing other fields and technologies.
- This is the era where wars would be fought not for land or ideologies but for water. Hence interlinking transfers for water would solve the problems of WATERWARS and ecological imbalances to a large extent.
- Rainfall in our country is erratic and uneven in space and time. Some areas are affected by floods, the others by drought. The river valley projects are designed to provide 'carry over' and 'flood storage' in the reservoirs to help in mitigating droughts and floods. To increase the GDP from present to 20% GDP in all sectors like agriculture etc.

Proposal of Interlinking of Rivers:

One of the important proposal was given in August 1980 and that named as 'National Perspective plan', by ministry of water resources formulated interlinking of rivers having two components:

- Himalayan Rivers Development
- Peninsular Rivers Development

National water development agencies (NWDA) was setup in July 1982 for carrying out feasibility studies of the proposed links.

Himalayan Rivers Development:

- It will have 14 links
- Construction of dams on tributaries of Ganga and Brahmaputra rivers in India, Nepal and Bhutan
- Linking of Brahmaputra and its tributaries with Ganga and with Mahanadi benefiting Assam, West Bengal, Bihar, Jharkhand and Orissa.
- Inter linking canal system to transfer surplus flows of eastern tributaries of Ganga to the West benefiting U.P, Uttaranchal, Haryana, Rajasthan and Gujarat
- 22 million hector of irrigation potential. 30 million KW of power generation, flood control in Ganga and Brahmaputra.

Peninsular Rivers Development component:

- It will have 16 links.
- Transferring surplus flows from rivers Mahanadi and Godavari to deficient Basins of Krishna, Pennar, Cauvery and Vagai benefiting Orissa, A.P, K.A and T.N, states with 9 link canals.
- Inter-linking of west flowing rivers, north of Mumbai and south of Tapi river, to benefit M.H and Gujarat.
- Transferring of 283tmc of Mahanadi waters to Godavari basin and 530tmc of Godavari waters to southwards

Merits and Demerits of Interlinking of rivers:

Merits of interlinking of rivers:

- Inter-linking of rivers will increase's the irrigation and hydropower generation.
- It decreases the flood and drought impact.
- It increases the water level in the area where the water availability in the area or river is less.
- By interlinking of rivers it increases the GDP of the nation.
- It increases the revenue of the state or central government.

Demerits of interlinking of rivers:

- By interlinking of rivers sometimes lots of area can chance of wash out.
- As large strip of land might have to be converted to canal, consider population living in the area must need to be rehabilitated to the new areas.
- Sometimes Deforestation and ecological imbalance takes place.
- Construction and maintenance cost is not much economic.
- Sometimes due to political involvement leads to delay of project

Issues and Challenges:

Interlinking of rivers project involves multifaceted issues and challenges related economic ecological and social costs. On this note 1year [2003] very sharply states that we have had great difficulty in completing even a single project successfully and we want to embark on thirty massive projects at the same time. As this project is of massive estimated cost a long-term planning and sound financial simulation are required to meet the standard of due diligence for such proposals. The huge expenditure may likely generate fiscal problems that are difficult to handle. The maintenance cost and physical position of dam's canal, tunnels and captive electric power generation will also involve huge financial

burdens. The certainly requires financial assistance from the private sector, as well as global capital agential.

The rehabilitation of project affected people in water infrastructure project will also pose a burning question before the concerned authorities. The construction of peninsular component alone expects to displace more than 5,83,000 people and submerge large areas of forest, agriculture and non-agriculture.

“No state is ready to give the water interlinking is best alternative way”

III. CASE STUDY IN ANDHRA PRADESH

There are number of states in India, But in this paper we concern Andhra Pradesh state as a ‘case study’ and going to study about number of links which has taken and which are going to be align or inter link of rivers.

Andhra Pradesh is located at south side of India and it comes under Peninsular component of river development of India. The major rivers in A.P are Godavari, Krishna, Tungabhadra, Pennar, Vamsadhar, Manjira, Nagavali.

In A.P from Mahanadi river to Vaigai river totally 9 links are proposed.

1. Mahanadi (Manidhadra) – Godavari (Dowlaiswaram)
2. Godavari (Inchapalli) – Krishna (Nagarjuna sagar)
3. Godavari (Inchapli Low Dam) – Krishna (Nagarjuna sagar Tail pond)
4. Godavari (Polavaram) – Krishna (Prakasham Barrage)
5. Krishna (Almati Dam) – Pennar
6. Krishna (Srisailam Dam) – Pennar (proddatur)
7. Krishna (Nagarjuna sagar) – pennar (somasilla)
8. Godavari – cauvery (grand anicut)
9. Cauvery (kattalai) - Vaigai – Guandar

N.W.D.A has carried out water balance studies of all basis/sub-basins and ascertained the water availability. The water availability under each basin is....

- 1.Mahanadi Basin : 395 TMC (surplus)
- 2.Godavari Basin : 530 TMC (surplus)
- 3.Krishna Basin: Deficit
4. Pennar Basin : Deficit
- 5.Cauvery Basin : Deficit
6. Vaigai Basin : Deficit

Following are the benefits accruing to those states from the transfer of Mahanadi water to southern states

- Andhra Pradesh : 275TMC
- Orissa : 116TMC
- Maharashtra : 56TMC
- Karnataka : 164TMC
- Tamil Nadu : 216TMC
- Transmission Losses : 98TMC

925TMC

Case study of these alignment as discussed below paper’s

1. Godavari-krishna-Pennar interlink:

From the Times of India article (TOI) on November 26,2018 report on Godavari _ pennar Interlink of rivers said by EX- CM of A.P.

The long-awaited project of interlinking the Godavari river with penna is all set to take shape with A.P. In the first phase, the interlinking of these two major rivers will help solve drinking water and irrigation problem in south coastal Andhra. In the second phase, it will benefit the parched Rayalaseema region.

The interlinking project was conceived several decades ago and thus far it had been gathering dust in official cupboards. The completion of the ambitious project would Rayalaseema region drought proof.

According to officials, Andhra Pradesh has been the number one state in India in terms of interlinking of rivers. The Godavari and the Krishna were linked 3years ago, and the linking of the Penna would ensure flood water flow into the three delta systems – Krishna – Godavari – Penna.

Penna river flows through Anantapur, Kadapa, Chittoor and Nellore districts. But the meagre water resource in the river are not able to cater to the needs of these districts. On the other hand a major share of Godavari water flows into the sea during the monsoon seasons.

“ If the Godavari and Penna rivers inter link it will benefit a lot to the Rayalaseema Region” said by officials

The state Government has proposed to complete the Godavari – Penna interlinking project in 5 Phase at an estimated cost of RS.83,796 crore. The first phase involves works worth RS 6020.15 crore. It was laid foundation at Nakirekallu in Guntur District.

The lifts will setup at the following areas and they are.....

Harischandrapuram, Lingapuram, Vyyandana, Gangireddypalem and nakirekallu. By bringing Godavari water up to Nakirekallu and linking to Nagarjunasagar right main canal, over 9.61 lakh acers in Guntur and Prakasam will be stabilised.

In the first phase 8500cusecs water for Pattiseema and 6870cusecs of water from Chintalapudi lift will be taken to Prakasam Barrage. From Prakasam Barrage 7000cusecs of water will be taken to Nagarjunsagar Right main canal by laying 10.25km pipeline from Krishna river and gravity canal at a stretch of 56.35km and using 5lifts.

The Schematic representation of interlinks as shown in below figure (courtesy from Eenadu Newspaper)



Godavari and Krishna rivers interlink:

Godavari and Krishna are the two major rivers flows in Andhra Pradesh.

When compare to Godavari river flow, Krishna river flow is less and due to less amount of water flow in Krishna, Krishna delta fields did not get sufficient amount of water to do agriculture.

To overcome this problem Inter linking of Surplus Godavari river with Krishna river will help a lot to Delta region as well as Rayalaseema region. The process how they did as follow (Courtesy from The Hindu Paper on sep15 2015).

3000TMC of Godavari flood water flows into the Bay of Bengal every year. Successive Andhra Pradesh government have been trying to harness at least 10% of this

water divert some of it into the Krishna, whose delta face an accurate shortage of water for irrigation from June to august.

While the plan is to eventually divert water from the Polavaram dam, since the dam is still underconstruction and will take at least 4-5 years to be ready, the CBN government decided to divert Godavari water from the Pattiseema lift irrigation scheme. This plan will kick off on sep16. For now, since September1, the government has been carried out a trail run, pumping water into the canal from the Tadipudi lift irrigation project of the Godavari. It’s this water that will enter the Krishna on sep15,2015.

It’s claimed to be first ever river interlinking in southIndia, the project sought to meet the irrigation and drinking water needs of drought – prone Rayalaseema region in the state.

The pattiseema lift irrigation scheme, proposes to liftthe water from Godavari Right bank, near the pattiseemavillage, and drop it into the Polavaram project right canal.Pattiseema is a village inPolavaram mandal of west Godavari district. 80TMC of flood water from the Godavari at this point will be diverted into the Polavaram right main canal, which is nearly complete up to Prakasam Barrage on river Krishna at Vijayawada, 174km away from RMC.

Rs 1,427 crore is the cost of the pattiseema project, which was approved on jan1,2015, and work on which begin on feb23,2015.

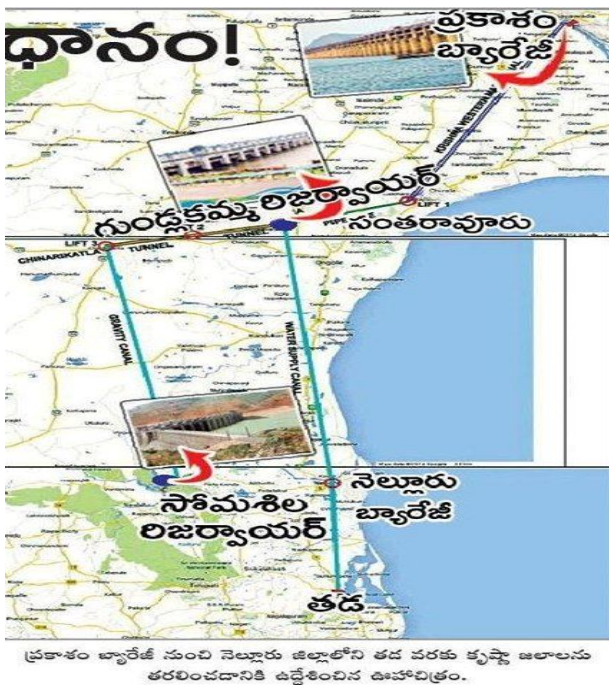
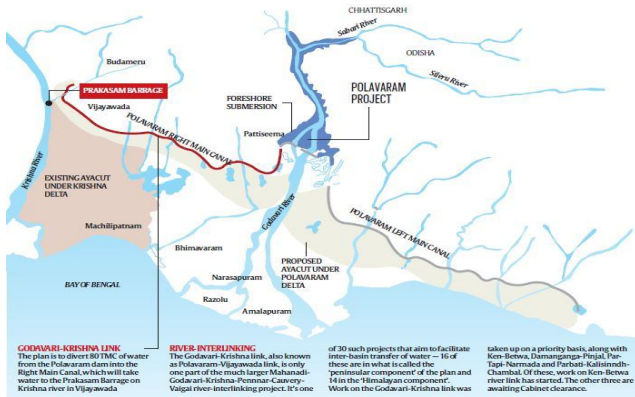
But this water has to be lifted from the Godavari at pattiseema and pumped to the Polavaram RMC, 3.9km awayBy next year, 24 vertical turbine pumps of 4611hp each will lift and pumped the water through 12rows of pipe lines into the Polavaram canal. The flood in Godavari lasts until the last week of November. The 24pumps will lift 8500 cusec of water, harnessing 80TMC over a period of 108 days for until the Godavari flood lasts, according to V.S.RameshBabu, Chief engineer, pattiseema project.

The project was first mooted in the 1950s by eminent engineer KL Rao, who was also the central water resources Minister. The plan was revived during Atal Bihari Vajpayee's NDA government but could be taken up only last year.(2015)

Andhra’s ambitious river linking project, titled pattiseema lift irrigation scheme, has found it’s self a place in the Limca Book of records for being complete with in a year.

It was declared “the first and fastest such irrigation project in the country to be complete in time, without any

budget enhancement.” The water is lifted when the flood level in Godavari rivers reaches to 14m rather than 13m level. The schematic line drawn in google earth shown below



From this link we can save the Krishna river percentage of sharing to Costa Region from srisailam and that saved percentage will divert to Rayalaseema region

Krishna – Penna River Interlink:

After interlinking of Godavari-Krishna river, the aim of A.P state government and CM CBN sir is to interlink Krishna – penna river when he was in ruling span (2014-2019).

Here we are going to mention the details about Krishna – Penna river interlink (courtesy from Andhrajothi paper)

After getting huge success in the interlinking of Godavari and Krishna rivers it was boosted the state government and look forward to interlink Krishna and Penna rivers. According to records from 2005 to 2013 yearly 55 to 975 TMC Krishna water goes excess and join in the Bay of Bengal from Prakasam Barrage. To over come this state government put they mind on this to divert the water and they assumptions and analysis are as follows.....

- From Polavaram project daily 11,200 cusec, from this 80TMC of Godavari water goes and joins in the Prakasam Barrage.
- By this nearly 80TMC of Krishna water will come in contact with the Nagarjunsagar Dam. This water will transfer to the Prakasam Barrage, not using 1% of water.
- By expanding the Komamaru canal (Krishna Delta) up to 95.40 km when done with this, from Prakasam Barrage daily 1TMC of water and there is a possibility to send to santaravuru village through Komamaru canal
- By this process we can supply this water to electricity house of 338MW.
- From this power house we have to lay the 3m width and 3m Diameter of mild steel pipes of 20. By using these pipe lines we can transfer 1TMC of water from santaravuru to gundlamareservoir of 35km length.
- Transfer the 3000cusec of water from Gundlama reservoir to Nellore Barrage, from Nellore Barrage we can send to Thada (area in A.P)
- Again, we can transfer some more water of 9000cusec from Chinarikatla to Somasila reservoir
- 3000 cusec of water supply from Gundalama Reservoir of length 151km we benefit to the Prakasam, Nellore district in terms of Drinking,Irrigation and For industrialization and there is also chance to supply 1500cusec of water from gundalama reservoir by laying gravity canal.
- Then after from Nellore Barrage to Thada we can supply water, there is also chance of supply the water from Thada to Chittoor.

- By lifting up the water there is a chance to wash up drinking water crisis in Prakasam, Nellore, Chittoor district. We need 720MW power to lift the water from prakasam to Thada.
- This project is going to be done in 2 Stages.
- The 1 stage almost cost 6,400cr for expanding and repairing works of Komoru canal and for lifting of water.
- The stage 2 almost cost 18,000crores for construction of gravity canal and increasing the capacity of reservoir.
- Figure shows the schematic representation of link in adjacent paper

Godavari-Banakacherla Lift Irrigation

This is the new project proposed on Godavari River to divert the Godavari Water to Banakacherla without intersect of Krishna water. This proposal was accepted on 25-10-2019 in CMO.

The primary aim of this project is Polavaram Project is at a height of 37meters from MSL at the same time Banakacherla Head Regulator is at a height 267meters from MSL the difference between these two elevations are about 230meters and we have to lift the water about 230m from MSL.

Project Primary View: From Polavaram to Banakacherla the distance is around 480km. In these distances some part of water is supplied under the gravity and some part by Lift method. For this project nearly 2100MW of power is needed and the overall project cost is estimated as 60000 cr . How it can be do:

1. Firstly, Govt is planning to built a Balancing Reservoir at Bollapalli in Guntur (Dt) and then to Banakacherla without intersecting with Krishna river.
2. Experts said that by constructing the Aqueducts on Krishna river , we can eliminate the intersecting of Godavari Water in Krishna water and then supplied to the Banakacherla.
3. Daily 2TMC of Godavari water from Polavaram Project is diverted, like this they divert the water upto 105days nearly 210 TMC of water has to be diverted according to expert's plan.
4. They used to lift the Godavari water after all fulfilling the needs for low-lying areas.
5. They construct a canal near the Polavaram project and the water is diverted through this canal and supplied to Pulichintala Project and from Pulichintala to Nagarjuna Sagar RMC then to Bollapali Balancing

Reservoir which have a capacity to store 150TMC of water and from Bollapali to Banakacherla water is diverted by Constructing the tunnel of 24km in Nalamala Forest.

6. From this Banakacherla Head Regulator the water is supplied to KC canal, SRBC, Velugodu Projects.
7. The project will stabilise water supply to 9.61lakh acres at Nagarjuna Sagar's Right Canal Basin. The project will irrigate 2lakh acres in Kanigiri of Prakasam District.

Mahanadi -Godavari Interlink:

1. Mahanandi – Godavari link is the first and critical link of 9 link system (mentioned above) of Mahanadi – Godavari – Krishna – pennar – Cauvery – Vaigi – Gundar under peninsular component of NPP.
2. The Government of Odisha was not agreeable for the Mahanadi (Manibadhra) –Godavari(Dowlaisawaram) link due to large submergence involved in Manibhadra Dam proposed under the link project.
3. As decided during weekly review meeting taken by the Hon'ble minister for water Resources, RD&GR on December3, 2014, NWDA has examined feasibility of Mahanadi – Godavari link to address concerns of Govt. of Odisha due to considerable submergence involved in Manibadhra Dam in Mahanadi – Godavari link
4. Alternate proposals of Manibhadra – Mahanadi with reduced submergence has been prepared and discussed with principle Secretary, WRD, Odisha on 06/04/2015 by DG, MWDA.
5. Based on the suggestions of WRD, Govt. of Odisha, NWDAas proposed a revised preliminary proposal of Mahanadi – Godavari link project with reduced submergence. A presentation on the revised proposal of Mahanadi –Godavari link project has been made to the Hon'ble CM, Govt. of Odisha on 29/04/2015 by the senior officers of MOWR, RD&GR.
6. Hon'ble minister (WR, RD&GR) held a meeting with the CM of odisha on 03/02/2016 at Bhubaneswar regarding Mahanadi – Godavari link project.
7. The sub-committee-2 under SCLR inits 7th meeting held on 29/09/2015 decided that system simulation studies of Mahanadi – Godavari link including the water Balance studies to as certain Surplus water should be carried out National Institute of Hydrology with in a 3 months period.
8. The Report on the hydrological studies and multi reservoir simulation prepared by NIH, Roorkee for the proposed Mahanadi – Godavari river link was considered by the Sub-committee1 system studies in the 10th meeting held on 03/03/2017 and the proposal was accepted. The finding of the study were informed to the special

committee for Inter-Linking of rivers in the 13th meeting held on 26/07/2017. The Govt of Odisha made certain observations and the Water Balance studies carried out by NIH which have been Replied by NWDA in July 2018. Further response from the Govt of Odisha is awaited.

- North Eastern centre for the Technology applications and research (NECTAR), New Delhi carried out topographical surveys of Submergence area of Barmul Dam site(using Remotely Piloted application system) (RPAS) for alternate studies of Mahanadi – Godavari Link project and submitted it's Reports

Schematic representation shown in the adjacent paper.....

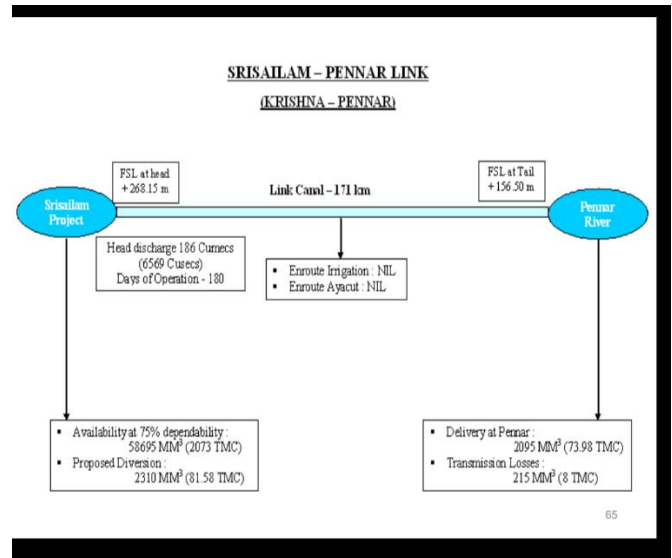
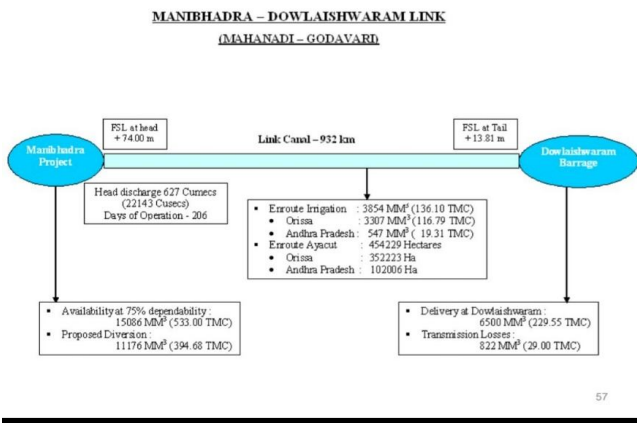


Figure shows schematic representation of link still on the paper.



Krishna – Penna river Interlink:

EX-CM sri Nara Chandra Babu sir says that we also looking forward to inter-link Krishna water from Srisaillam Dam to Penna river Somasila Dam and total estimated cost around 6,200crores (courtesy from The Hindu). But the construction and alignment of this link is still pending and state Irrigation Board Proposed a plan to connect srisaillam Krishna water to Penna somasila Dam.

GODAVARI-KRISHNA-CAUVERYRIVER-LINING PROJECT:

- Days after the Lok Sabha election results, there was minor fracas on the internet over a tweet made the BJP’s Tamil Nadu wing ‘My first job would be to lining Godavari and Krishna and bring water TN.
- while there is no argument with the second criticism-indeed governments should not discriminate against people who may not agree with them, what about the first part? Are Krishna and Godavari already linked? What does this project have to do with TN, a state that neither river passes through?

GODAVARI AND KRISHNA INTERLINKING:

The proposal to Godavari, which is prone to flooding and Krishna, which doesn’t have enough water, has been around for several decades. While river-interlinking for the purposes of navigation as an idea was mooted by the British in India in 1972,engineer and union minister KL Rao proposed the linking of Godavari and Krishna for irrigation

The decades- old proposal finally took shape in the 2000s, and in 2016 the Andhra government linked the two rivers with the pattiseema life irrigation project, in Andhra’s west Godavari district. On sep 15,2016,the floods water from Godavari was diverted to the prakasam barrage on Krishna river 124 km away. The project was designed to meet the irrigation and drinking water needs of drought-prone Rayalaseema region in the state .

The project in fact made it to the Limca Book Of Records for being completed within a year, but has also been Criticised by the CAG for ‘wasting funds’.

THE PLAN FOR TAMIL NADU:

Now, coming to Tamil Nadu. On the day of the Lok Sabha results, in an interview with English news channel Tiranga, Nitin Gadkari had said “As we said in our manifesto, we will include a branch called Jal Shakti and PM MODI also mentioned this in meeting recently that where water is less, water (can be transferred) from one basin into another. I am a minister of this branch and we are talking of joining the waters of Godavari and Cauvery.

What he was referring to is the project to link rivers, including the Godavari, Krishna and Cauvery -all of which originate in the Western Ghats and flow towards the east.

According to the feasibility report of the Cauvery Vaigai Gundar project by the National water development agency, the river- linking envisages a diversion of surplus flows of the Mahanadi basin and the Godavari basin to the water short Krishna ,Penna, Cauvery, Vaigai and Gundar basin in the south.

Basically, the plan is to divert 12,165mm³of water annually from Mahanadi to Godavari, through the Mahanadi-Godavari link canal. And then ,from Godavari 26,122mm³ will be diverted to Krishna through 3 links- Inchampalli-Nagarjunasagar, Inchampalli -Pulichantala and Polavaram-vijayawada .

Out of the water thus brought to Krishna, the project will divert 14,080mm³ to Pennar through three link canals – Almatti-Pennar, Srisailam-Pennar and Nagarjunasagar-somasila.

And from pennar, a quantity of 8,565mm³ of water will be diverted to Cauvery through the Somasila-grand Anicut link.

THE PENINSULAR RIVER-INTERLINKING PROPOSAL:

The proposed river-link canal would traverse through the districts of Karur Tiruchchirappalli, Pudukkottai, Sivaganga, Ramanathapuram and Virudhunagar in Tamil Nadu, for a length of 255.60km. In addition to enabling irrigation, the water is also supposed to provide for domestic and industrial water requirements.

WHAT EXPERTS SAY:

However, the new announcement by the minister has once again sent alarm bells ringing among experts who have pointed out that the notion that the linking of rivers would mean more efficient distribution of water and reduction of flooding is fundamentally flawed.

Speaking to TNM, professor S.Janakarajan of the Madras institute of development studies said that river- linking is not like plumbing work. “It’s not about disconnecting and connecting a pipe. Since the river linking project would amount to changing geography, ecological implications would be huge for the present and more so for the future generations”, he cautioned.

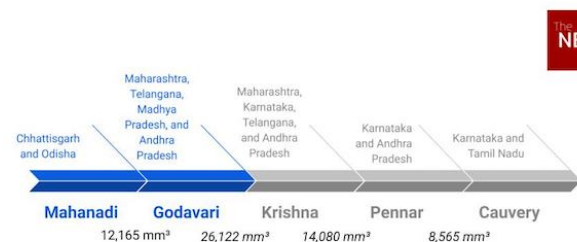
He also questions the methodology for the calculation of the supposed surplus, asking, Surplus in the Godavari basin is reported to be 1,100TMC ft.

This raises questions: Who calculation this surplus, when, where and using what methodology? Even if this surplus exists today, it may vanish tomorrow given the.....

increasing demand for water. Surplus is not going to stay forever, It is a dynamic concept .

“As per the original peninsular link, first Mahanadi should be linked Godavari. This should be the first phase. The second phase is linking Godavari, Krishna and Cauvery. Here, without completing the first phase, the second phase is attempted. This the objection raised by the government of Telangana. The main argument to complete first phase is to get the surplus from Mahanadi before diverting water from Godavari to other states. Telangana and Andhra Pradesh governments don’t agree that there is surplus in Godavari. Where without the scarcity?” he asked

In addition to these questions, the professor, who specialise in water and environmental issues, said that the lifting and pumping involved in the project would demand a lot energy which may not be feasible to provide.



The Peninsular River-Interlinking Proposal

(Courtesy from The NEWS paper.)

Details about proposed links in Andhra Pradesh

DETAILS OF PROPOSED LINKS													
Sl. No.	Name of the Link	Connecting Rivers	FSL at (m)		Length Km.	Discharge in M ³ /Sec.	Volume Transfer		Enroute Irrigation		Losses		
			Head	Tail			Mm3	TMC	Volume Mm3 Area Ha.	Volume TMC Area lakh Ac.	Mm3	TMC	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Manibhadra - Dowlaiswaram	Mahanadi - Godavari	74.00	13.81	932.00	627.00	11126 6500	325 230	3854 454229	136.00 11.22	822	29	
2	Ichampalli - Nagarjunasagar	Godavari - Krishna	142.00	182.77	299.00	1219.00	16426 14200	580 501	1850 319708	65.00 7.90	376	13	
3	Ichampalli - Pulichintala	Godavari - Krishna	106.68	69.68	270.00	263.00	4371 1623	154 57	2598 694882	92.00 17.16	150	5	
4	Polavaram - Vijayawada	Godavari - Krishna	40.23	27.96	174.00	361.00	4903 3305	173 117	1448 148418	51.00 3.67	150	5	
5	Almati - Pennar	Krishna - Pennar	510.00	434.40	564.00	208.12	1380 NIL	70 NIL	1778 234589	63.00 5.79	202	7	
6	Srisalam - Pennar	Krishna - Pennar	268.15	156.51	171.00	186.00	2310 2095	82 74	NIL	NIL	215	8	
7	Nagarjunasagar - Somasila	Krishna - Pennar	151.67	102.63	394.00	555.00	12146 8648	429 305	3166 560606	112.00 13.85	332	12	
8	Somasila - Grand Anicut	Pennar - Cauvery	91.96	59.70	538.00	616.40	8565 3855	302 136	4325 491200	153.00 12.13	385	14	
9	Kattalai Regulator - Vaigai - Gundar	Cauvery - Vaigai	100.75	78.87	250.00	174.14	2252 NIL	80 NIL	2007 353337	71.00 8.73	136	5	
TOTAL			...	...	3592.00	...	...	...	3256969	80.45	2768	98	

Note: 1) In Col 9, the upper figure indicates the gross diversion while the lower gives the quantity reaching the recipient river.
The difference is accounted for the enroute irrigation and losses.
2) In Col.10, the upper figures are volume used enroute and the lower figures are area irrigated enroute.

Benefits from the above links:

- 13 million Hectares of irrigation Potential
- 4million KW of power.
- Drought mitigation in the states of Andhra Pradesh, Karnataka and Tamil Nadu.
- Flood control in Mahanadi and Godavari Basin
- Increases the Revenue of the States

Funds allotment for Doing works:

NABARD Funding under PMKSY-AIBP

- NWDA has been identified to act as an agency for borrowing resources from LTIF and release Central Assistance to the State Governments towards the prioritized PMKSY-AIBP (Major & Medium Irrigation) Projects and their CADWM works, for their completion in time bound manner. Memorandum of Agreement for borrowing from NABARD to fund Central share in these projects was signed by this Ministry of Water Resources, RD & GR, NWDA and NABARD on 6th September, 2016.
- NWDA has signed an contract agreement with WAPCOS Limited for “Establishment of Project Monitoring Unit for Monitoring and Management of Pradhan Mantri Krishi SinchayeeYojna” in October 2017. A Project Monitoring Unit (PMU) has been set on 4.10.2017 by M/s.WAPCOS Limited in the CSMRS campus, New Delhi. A Consultancy

Monitoring Committee(CMC) was constituted vide letter no. NWDA/Tech-II/3/22/2018/235-41 dated 03.05.2018 to monitor the progress of the assignment to PMU under the Chairmanship of Chief Engineer(HQ), NWDA, New Delhi.

- An amount of Rs.15779 Crore has been released (upto 10.12.2018) for various projects located in the States of Madhya Pradesh, Odisha, Telangana, Manipur, Maharashtra, Punjab, Karnataka, Rajasthan, Bihar, Jharkhand, Uttar Pradesh,, Andhra Pradesh, Chhattisgarh,Gujarat, Jammu&Kashmir and Polavaram Project Authority and North Koel Project.

concerns/views of Government of Andhra Pradesh:

- The rivers under Himalayan Component are perennial and that of peninsular component are not perennial. Hence these two components are to be taken simultaneously as there is no surplus water available in Godavari for diversion to Peninsular Region.
- The century old Godavari Delta ayacut of 10lakh acres gets delinked from assured gravity flows of Godavari. The ayacut has to depend on distant source of Mahanadi with 930km long link traversing through cyclone prone areas.
- Nagarjunasagar ayacut, now getting dependable Krishna water by gravity has to depend upon Godavari water pumped from Ichampalli with a head of 120m and traversing a distance of 300km.Proposed Ichampalli and Polavaram power stations with installed capacities of about 2000MW may not bematerialize due to lack of sufficient Down stream flows. Dependable flows will be diverted and instead A.P will be made to depend on flood flows.
- A.P view is that there is no sufficient balance water (out of dependable yield) to be spread in Godavari.
- The water proposed to be diverted from the Godavari at ichampalli site is 734TMC as against the availability quantity of 673TMC. Thus, it could result in adverse effects on theexisting as well as proposed projects and cause serious environmental problems.
- The total available water in the Godavari are 1483TMC as per the hydrological studies made by the WAPCOS. The existing and committed utilizations are at 1303TMC and thus only 180TMC of excess of water available after meeting all the requirements including deficit of water availability to an extent of 98TMC in the River Godavari.

All the waters proposed for the inter basin transfer from the Godavari basin belongs to Andhra Pradesh state according to the Godavari water Dispute Tribunal Award.

- There is a deficit of 222TMC in the Krishna Basin and there is deficit of 68 TMC in the pennar Basin.
- The NWDA proposed to transfer the water of Godavari to Cauvery Basin without considering the requirements under the proposed projects like AMRP, GNSS, HNSS, Veligonda, Kalvakurthy LI scheme and Nettampadu LI scheme which are located in drought prone areas.
- Hence there is necessity to import waters from outside the state, by participating in the inter-linking of rivers at the national level.

IV. PEERRE VIEWED

This paper reviewed by my college professors as well as Irrigation Department AEE they named as

Dr.M.Prasad M.sc, Ph.D. Expert in RS&GIS
 Mr.B.N.Vinod Former AEE
 Mr.C.C.Suresh Babu (Ph.D) Research guide
 Mr.Murali AEE of Rajole Anicut

After they reviewing my research paper, they suggest me to work on “Kundu” River in Kadapa District which is a frequent flood flow river and created a lot economic effect in Kadapa District as well as Kurnool District and add that research work

V. DIVERTING KUNDU RIVER FLOOD WATER

After peer’s review, I worked on Kundu River in Kadapa District.

The Kundu River is a tributary of the Penna River in the Rayalaseema region of Andhra Pradesh, India. Originating as a spring near the village of Uppalapadu in Orvakal Mandal of Kurnool District, it goes through many changes before merging with the Penna at AdinimmayaPalli village of Kadapa District. It is known for frequent floods that bring heavy damage to the Nandyal and Koilkuntla areas, and hence it is popularly called as “Sorrow of Nandyal”.The Kundu River drains around 6,000 acres (24 km²) in its flood plains, consisting of 41 villages. It covers 6 assembly constituencies in Kurnool and Kadapa districts. Many streams and brooks, including the Galeru, Paaleru, Nippuvaagu and Sankalavaagu, are the main sources of flood water. Galeru and Paaleru in particular bring heavy flood water from the Nallamala hills. The Kundu is ferocious in the rainy season, particularly during cyclones.by frequent floods, incurring heavy losses to

properties and farmlands. The villages and the Nandyal town located close to the Kundu river are affected farmers in this belt are not guaranteed crops until harvested, as no one can predict the precise arrival of floods. From July to December there are several instances of flooding on this river. In 1994 floods incurred around Rs.60 crores of loss. On August 20, 2000, around midnight, the people of Nandyal were inundated with flood water. Almost everyone in the town experienced some loss of property, and 10 people died. In the much-publicized Kurnool floods of 2009, Nandyal was cut off from civilization for 5 days as the flooded Kundu encircled the entire town.

Not only Nandyal Town and Kurnool District effect from the floods of Kundu, But also Kadapa district mandals of Rajupalem, Chappadu. From the past 5years kundu water flow increases to due rain fall and excess of water comes from srisailam dam and from Rajole anicut (located at Kurnool-Kadapa work)

Rajole anicut is not used to store the water which comes from Sunkesula and from Srisailam when they capacity are filled. Every year the Kundu river get affect by the Floods and get surplus of water from the Sunkesula and from the Srisailam.

According to Krishna water Board the water have to be release to Somasila from Srisailamand that water flows through Kundu river, due to heavy flow in Kundu river the Rajole anicut can’t store the water which is coming from srisailam and anicut lifts the gate and allows the water do the downstream and due to allow of water to the downstream the low laying areas like Sitaramupram etc., in chapadumandal and loss several properties and fields as well. Some people in villages says that “If we increase the Hight of the Rajole anicut the areas which are laying at Upstream Side almost will wash out”.

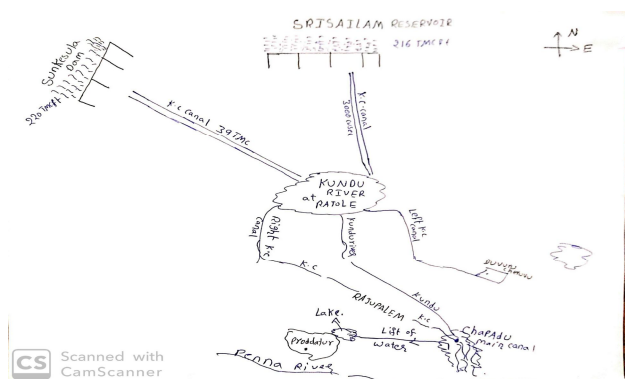
Highest Water Released Yearly in Kundu River@Rajoli Anicut				
S.No	Date and Year	Time	Feets	Discharge
1	17/10/2001		20.90	1,58,918
2	16/09/2006	06.00PM	14.20	34,190
3	24/06/2007	01.00AM	19.50	127,535
4	09/09/2008	06.00PM	12.50	15,846
5	05/10/2009	01.00AM	20.00	136,364
6	26/08/2010	12.00PM	12.80	23,176
7	22/08/2011	06.00AM	12.80	23,176
8	05/09/2012	06.00AM	11.40	9,174
9	17/08/2013	12.00AM	13.50	33,944
10	17/09/2014	12.00PM	13.00	25,382
11	27/09/2015	06.00AM	11.30	7,656
12	31/08/2016	06.00PM	13.00	25,382
13	17/09/2017	06.00AM	12.30	13,258
14	10/09/2018	06.00AM	12.80	24,856
15	22/08/2019	06.00AM	15.20	55,717

Table shows the flood level at Rajoli Anicut

Possible ways to divert the kundu flood water:

1. By establishing pump scheme:

Establishing pump scheme at chapadu main Kundu river comes from razole , depends upon the head and flood flow .When flood reaches to peak point the pump will start and suck the water from the kundu river at chapadu and that water is send to proddatur to demolish the water problem . The schematic rough drawn as shown in below (This is an analytic drawn) and when I did a survey there is a huge difference between the R. L’s and it seems to be not economical.



2. KUNDU TO TG (SR1)&SR2:

This is the New Project Proposed by the A.P Government to divert the Kundu Water to Telugu Ganga Project by using Lift of Estimated cost is 598cr. Total 8TMC of water from kundu is diverted to duvvur tank and to SR1. Estimated quantity of water is diverted nearly 1000cusecs per

90days. Kundu to duvvuru tank the lift distance is 6km and duvvuru tank to SR1 is 2.5km (Work in Progress)

Conditions to Inter link or Transfer the water:

However there some conditions we have to look over to interlink or transfer the surplus water in one river to the deficit river. Suppose If we consider the Author’s view of diverting Kundu flood water to Mylavaram Dam must and should satisfy the following conditions are...

1. If the Water is flowing to South side and If we divert the water to the again south side then there is no use, the water finally reaches to the south side sea.
2. While we are diverting to other Dam or Reservoir and that Dam or Reservoir have to located at sufficient elevation than from *which* (River or Dam) we are transferring the water.
3. The total catchment area of the River or Reservoir from which we are Drawing or Diverting the water have to be known, Geographical location of that area have to be known and also the Contours of that area which we are transferring and also to which we are storing.
For example: If we *Draw* the surplus water and diverted to the other source which have deficit water of lower elevation is no use at all. *So*, it should be located at Higher elevation.
4. Based on the Topographical conditions we have to decide either we have to construct a Inundation canal or a Lift irrigation pumps to divert the surplus of *water*.
5. Last but not least sometimes we have look over the Budget of *aligning*, If the alignment will cost high budget then we go for the alternative alignment which gives more benefits with less cost, *sometimes* political considerations also play’s key role.

VI. CONCLUSION

No state is ready to give the water to the other states due to some political and some unfamiliar views. So, to reduces these kinds of conflicts over the water Inter linking of Rivers with in the state gives lot of advantages to the state and also helps in nation development. If not in the future the wars will occur due to water crisis and the war named as WATER WARS. Water is *cannot* be created, but it can be stored, diverted and drawn. Make count every drop of rain water as well as River water which is flowing excessively and joins in the sea. Inter linking of rivers reduces the excessively surplus flow, though it is costly but it is the only alternative to do so.

VII. APPENDIX

In the case of the Interlinking Project, no official figure is available for the number of people to be displaced. It is estimated that the network of canal's extending to about 10,500km would displace about 5.5 million people, who are mostly tribal and farmers. On the 23rd of May 2003, the ministry of forest and Environment put out a 23-point concern about the environmental implications of the proposed interlinking project. These includes Submergence of forests and cultivated lands etc., There is an acute need for examining the presuppositions on which the whole interlinking project has been conceived

The above links which was mentioned only Godavari-Krishna link has completed and remaining links are yet to be complete.

VIII. ACKNOWLEDGMENT

I would like to express my special tanks to Mr.Murali Sir AEE of Rajole Anicut Kadapa District as well as to my project guide Mr.C.Chinna Suresh Babu, my college Principal Dr.G.Srinivasula Reddy who gave me the golden opportunity to do this wonderful project, which also helped me in doing a lot of research.

REFERENCES

- [1] From Ministry of Jal Shakti water Resource Department Website.
- [2] Navven.K.MehtaMahakal Institute of Technology, Ujjain (M.P) India.**Geo-Eco-Marina**, [S.l.], v. 19, p. 137-144, mar. 2018. ISSN 1224-6808.
- [3] Dr.RavindraAriketi Paper on Interlinking of Rivers
- [4] Mk Rahman Retired Chief Engineer in Irrigation & CAD Department article on Inter linking of Rivers.